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CONTENTS

ORIGINAL ARTICLES

WARREN A. DENNIS, M. D., St. Paul—Compulsory Health Insurance..... 1

CHARLES H. MAYO, M. D., Rochester—Jaundice from Pancreatic Disease..... 6

N. J. NESSA, M. D., Sioux Falls—X-Ray Diagnosis of Gastro-Intestinal Diseases.. 10

W. A. COVENTRY, M. D., Duluth—Potter Version..... 18

MAX H. HOFFMAN, M. D., Minneapolis—Blood Transfusion with Special Reference to the Sodium Citrate Method..... 24

WALLACE H. COLE, M. D., St. Paul—The Treatment of Tuberculosis of the Spine.. 34

CARL A. HEDBLOM, M. D. Rochester—The Treatment of Pericarditis with Effusion. 40

S. E. SWEITZER, M. D., Minneapolis—Dermatology and Internal Medicine..... 51

(Continued on Advertising Page III.)

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MINNESOTA MEDICINE

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COMPULSORY HEALTH INSURANCE*

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The President's address, in contrast to the papers presented on the regular programs and which are strictly scientific in character, very commonly deals with some topic concerning the policies or general welfare of the society or of the profession as a whole. This precedent I shall follow and the subject selected for consideration is that of Compulsory Health Insurance. I had wished to consider also some other aspects of the changing character of medical practice, but soon found that this subject alone was altogether too large to be more than hastily touched upon within the proper time limit.

That the problem of Compulsory Health Insurance has anything more than an academic interest for the members of this body would hardly be suspected, or perhaps even its existence known, from the perusal of the journals with which we are most familiar, or one the ultimate solution of which need give us any concern. But when it is known that legislative commissions for the study of the question have been appointed in at least nine of the states, that some of these commissions have reported favorably on the scheme, and that others have recommended it for further study, and when it is further realized that bills for its establishment have been introduced in no less than six state legislatures, it will be appreciated that some force is behind this sort of legislation even in the United States of America.

Voluntary sickness insurance has been in force in Europe for many years, and in certain trades even compulsory sickness and accident insurance, but the first comprehensive law was that of the new German Empire passed in 1884, which has been amplified from time to time to include additional classes of workers, and to cover maternity, old age, and disability as well as accident and sickness. Bismarck, who was responsible for most of this legislation in Germany, stated that his idea was "to bribe the working classes, or if you like, to win them over to regard the State as a social institution, existing for their sake and interested in their welfare." He was alarmed at the time at the rapidly growing strength of the socialist party in Germany, and by this means aimed to snatch its weapons and use them in the interests of autocratic government. Whatever else this legislation may have accomplished, Bismarck's chief purpose was achieved if we may trust the soundness of the following quotation from "The Survey"—"The German Social Insurance, with its funds of billions, has largely been the source of astounding spiritual strength of Germany which surmounted even its defeat."

In England, compulsory sickness insurance was inaugurated by David Lloyd George, then Chancellor of the Exchequer, and enacted into law in 1911. In both Germany and England the voluntary societies long in existence were made the foundation for the new insurance structure, and soon lost most of their identity in the multiplicity of administrative officials and regulations from above. In both countries, a certain portion of the premium is deducted from the wages of the worker, about two-fifths, another portion is extracted from the employer, also about two-fifths, and the remainder is contributed by the state.

The United States, especially since the end of the World War, is in a much better economic condition than any other nation. Its people as a whole enjoy a higher standard of living than those of any other country, very much higher

*President's Address read before the Minnesota Academy of Medicine, St. Paul, September 14, 1921.

than most of them. It is, therefore, conceivable that a system of insurance that might prove advantageous in less favored countries might be wholly unnecessary, and in consequence undesirable in our own. If, on the other hand, the system were shown to yield unsatisfactory results in those countries, where, on account of small incomes and meagre savings, it should be most applicable, then it would seem to be doubly undesirable in our own.

The chief advantages claimed for compulsory health insurance are that it provides medical care for those who would otherwise be obliged to do without, while at the same time relieving them from the stigma of dependence upon charity; that it promotes thrift since the beneficiary must meet this charge regardless of other obligations.

As members of the medical profession we are of course interested in knowing what the effects might be upon the medical men who are drafted, for that is what it amounts to, to do this class of work. In Great Britain, before the act became operative, a so-called doctors' strike occurred, the men declaring they would never accept service under the panel. But when it became evident that some would accept service, large numbers hastened to sign up, fearing that they would otherwise lose much of the work they already had, since many, or, in some cases, most of their patients, would come under the provisions of the compulsory insurance act. Some of these men were already doing contract work for the voluntary insurance societies, of which there were many, and in some cases doing it for less per head per annum than the government offered under the insurance act.

Opinions as to the effect of the act in England differ. According to Alfred Cox, Secretary of the British Medical Society, the act is working satisfactorily, and the physicians working under it are satisfied, but there are other opinions of a contrary nature. The work in England is all done under the direction of the Ministry of Health with local committees, of which there are 200 in England, Scotland and Wales. One of these committees consists of 60 persons of whom five are doctors. Besides these there are Medical Services Sub-committees, Panel Committees and Local Medical Committees, Allocation Committees, etc.

The rules and regulations determining the various procedures, the mode of settlement of disputes between doctors and patients, calculation of benefits, certificates, records, etc., required under the act make up a volume of five hundred pages. If it were possible in the time at my disposal, I would like to give you examples of the numerous certificates required of both doctor and patient to meet the requirements of the law in even the simplest case resulting in a temporary disability. The work of making out the various certificates or reports must in a large percentage of cases be much greater than that spent in the diagnosis and treatment of the condition. Nor is the clerical work ended when the doctor and the patient have done their part. The central officers must keep complete records of all cases and compute the benefits to which the patient is entitled. And the benefit, when computed, can be obtained by the patient only by following the prescribed rules and during prescribed hours on fixed days. The doctor's work becomes largely that of a clerk. Sufficient time for careful study and diagnosis and efficient treatment appear to be out of the question. In this connection I cannot refrain from quoting at some length from the personal experience of a well known American physician, Dr. Emil Ries, of Chicago, with this kind of work in Germany. Dr. Ries took the practice for a month of one of the state physicians, located in Berlin, while the latter was away on vacation. Here is what he says:

"When I became acquainted with the doctor he showed me the office, which was the living room of the family; the best room of the family served as waiting room. There was a little hall (dark as most halls in Berlin) where a man admitted the patients. There were office hours in the morning from eight to ten, and often we had to start at seven in order to get through. After ten, the calls were made at the homes. In the afternoon from two to four there were office hours, and then more calls, and in the evening from eight o'clock on, office hours again.

"I had to see between 30 and 40 patients

from eight to ten. If I saw 30 patients in 120 minutes that gave each patient exactly four minutes. Figure it any way you want. You might give one ten minutes, then you can't give the next one four. Now maybe some of you have consulted physicians who made a thorough examination and you probably remember that it took more than four minutes. How closely could those patients be examined? They could not be examined. There was a very ingenious arrangement by which the doctor took care of that practice. In front of him on the desk was a set of pigeon holes with prescriptions in them. Mrs. Doctor used to write these prescriptions while he was out making calls. These prescriptions were ready—stacks of them. When the man came in at the door he was asked 'What is the matter?' He would say he had a cough. The doctor reached in and pulled out a prescription for cough, 'Here, a teaspoonful three times a day. Next.'

"The next one had a headache. 'Powder, twice a day, morning and evening. Come back tomorrow.' That is the way it was done—not only in that office but in every office of the doctors working under the Health Insurance office. I watched him for a few days before he left, as I wanted to learn the tricks, and I said, 'How do you manage with the people who have some real trouble, not simply fancy a headache or a little bit of a cough that doesn't matter?' 'Oh,' he said, 'that is very simple; they come back. The others get one prescription; they are all right. Maybe they come back for another prescription after two or three days. Most of them get well, anyway. They would not come if it cost them something. They only come because it doesn't cost anything.'

" 'Well, what about the man's working efficiency?' 'Oh, well, they have to pay him while he is not working, therefore, he lies off as long as he can. As long as he has a prescription from the doctor he is sick and he lies off two or three or four days of a week. That insurance pays for it; not only buys his medicine, but pays him a part of his wages.'

" 'Now, what do you do with the man who is really sick?' 'I put him aside and when I am through with the mob I take that man in the corner and look him over.' I watched him to see how many he looked over. He had just exactly one to look over. That man was sick enough, to be certain.

"The next was: 'How do you make your calls; how many calls do you have to make?' 'Oh, I make ten or fifteen calls in the morning, twenty calls in the afternoon.' 'Take a cab?' 'No, you can't take a cab. Those people are all social democrats. If you arrive in a cab they call you a plutocrat and won't have anything to do with you. You walk.' So to get around in Berlin from the doctor's office I took a car for the farthest call, as far away as I had to go that day, and then walked back towards the office, making all calls in that direction, and did that in various directions, and every time I came to the office I picked up some more calls.

"'How do you do at the homes?' 'Same thing. Give them a prescription, that is all they want.' 'Well, now, if they are really sick, what do you do?' 'Well, send them to the hospital; don't bother with them, it doesn't pay.' It doesn't pay, that was the most important thing.

"Well I saw 30 people in the office in the morning. I saw 10 or 15 at calls in the morning. I saw 10 or maybe more in the afternoon. I made 15 to 20 calls in the evening and I had to see 20 to 30 again in the office in the evening. I was so dead tired when I was through that I could not even read a newspaper, and as for reading up on interesting cases it was utterly out of the question.

"I said to the man, 'How can you live that way? You are nothing but a slave. You might just as well sell pants or nail boxes. There is no more intellectual effort to this kind of business than there is to the most ordinary working man's life.' 'Well,' he said, 'I know it. I am going down. I haven't any brains any more. I haven't the energy any more to read anything. I haven't the time to go to a medical meeting because if I go I lose my calls; if I lose my calls, I don't make a living.'

"I began to get interested in how much he made and I found out. For an office call, six and a quarter cents (pre-war exchange, not present exchange). That was long before the war. For a call at the residence, 12½ cents.

Do you wonder now why he had to make 30 examinations in the office? Thirty times 6 cents is $1.80. What kind of service did he give those patients? Was that service worth any more than six cents? Did that patient get what he paid for? He paid nothing and he got nothing.

"Four years later the state doctor spent six months in a sanitarium for a nervous breakdown, and in two years more he was dead."

Such an experience reads like comedy, but unfortunately it is not comedy, but tragedy. It represents the manner in which state medicine is practiced not only in Germany, but in Britain as well, and a study of the experience lays bare most of the basic defects of the whole scheme. If the results are half as bad as this account would indicate, then either there is nothing in the healing art or this is a gross travesty upon it. It represents a tremendous machine turning out an insignificant product of the poorest quality. And in England they are finding out that the machine is expensive to run.

The per capita cost of administration alone under compulsory insurance run by the state now exceeds the total cost under some of the old voluntary societies. Bad as we consider this class of contract work, the old system had at least the merit of devoting its funds, not to the running of a complicated administrative machine, but to paying for medical services and no physician could hope to retain his job unless his services were satisfactory to the society he served.

But the mounting cost of administration is by no means the most serious defect of the system. So far as the medical profession is concerned the effect is deadly. The incentive and opportunity to improve one's self and one's condition, which to my mind are fundamental to the success of any human endeavor, are almost wholly removed, with the result that the panel physician becomes little more than an automaton going through a monotonous heart breaking daily grind, and activated chiefly by the strings manipulated by the dictator from above. It is a fortunate thing for the science and art of medicine that not all the people of Britain come under the provisions of the compulsory insurance act, and that in consequence a part of the medical men are left free to practive their profession on their own merits. These may do something toward sustaining the traditions and aspirations of the profession, but one or two generations will be required to show all the evil effects of the system. In Germany, where a high percentage of the people come under compulsory insurance, we are told by E. H. Ochsner, who is an authority on the subject, that the brightest young men are no longer attracted to the study of medicine, and to this fact he ascribes the loss by the German speaking peoples of the leadership in the profession which they so long and deservedly held. Of necessity it is not the profession alone which loses, but ultimately the whole populace which it serves.

According to Hoffman "regardless of positive assurance to the contrary, the panel system is not satisfactory to a large proportion of panel patients. Not only are many of the most frequent and serious diseases excluded from care under the law but many of the insured prefer to secure physicians at their own expense." And since they have a choice of physicians serving on the panel it is apparently the system that destroys the physician's efficiency. An officer of one of the Fraternal Societies says that "it appears to him that the medical service under National Health Insurance has degenerated into a most miserable service." "The attitude which it seems is required of the Society must be to doubt every medical certificate and every claimant for sick pay." Worse still, Hoffman quotes "There is an entire lack of that fraternal spirit which formerly permeated the Friendly (i.e. the Voluntary) Societies." "Instead of broadening the spirit of mutual aid, there prevails now a more contracted and suspicious point of view, emphasized in countless rules and regulations, and a large paid advisory staff, to safeguard the State against malingering and frauds."

As might be expected under such a system a study of the statistics shows that there has been a gradual increase in the average number of days of sickness for which treatment and benefits are claimed under state insurance. It is only human nature to attempt to get as much

as possible for nothing or for a minimum fixed sum. We have sufficient examples of that right at home.

Instead of promoting thrift on the part of the individual as has been contended the result has been the opposite. Insured persons have assumed that whatever might arise, the state would take care of them and have spent everything they made in a reckless and indiscriminate manner. There is a very different story in this country where, as the result of individual and voluntary effort, there is each year an increase in savings bank deposits and in insurance, both ordinary and fraternal. In the words of President Hadley, of Yale, "We need measures which shall increase individual responsibility rather than diminish it; measures which shall give us more self-reliance and less reliance on society as a whole. We cannot afford to countenance a system of morals or law which justifies an individual in looking to the community rather than to himself for support in age or infirmity."

One of the most serious aspects of the whole proposition, and the one that is likely at first to be entirely overlooked is the great increase in the number of government employes. We have had this danger brought home to us in the United States since the close of the war, but it is doubtful if many realize what a veritable army of men and women derive their living from government jobs, in other words from the money the rest of us pay in the form of taxes. But if one stops to consider the multitude employed in the various departments of municipal, county, state and federal governments, with all their officials, bureaus, commissions, boards and inspectors, not forgetting income tax and prohibition enforcement agents, each provided with a coterie of clerks and stenographers, he is prepared to believe Irving T. Bush when he says that even leaving out of account the army and navy every ten workers in the country must support one public employe.

The tendency of government today is to regulate everybody's business and that tendency is growing in spite of the disastrous experience of the past. Can anyone point to anything that the Government has ever done in an efficient and economical manner? The conduct of the post-office department is always pointed to as the one shining exception and yet it will be remembered that some years ago John Wanamaker offered to pay many millions of dollars for the monoply of the post-office business to be conducted at prevailing government rates.

To my mind government is a necessary evil, and its functions should be limited to those that cannot be otherwise exercised. Recent years have shown an alarming tendency to delegate the duties of the three chief departments of government, executive, legislative and judicial, to so-called commissions, which in consequence are clothed with well-nigh autocratic authority, and, with their hosts of political employes, not only withdraw great numbers from the useful field of production, but add them to the armies of government dependents with the inevitable accompaniment of inefficiency, increased taxes and graft. I do not wish to see added in this country a department or commission taking charge of the healing of the sick and running it as a political appendage of the party in power, and this is certainly what would happen.

And finally, the question arises, whence comes all this agitation for this class of legislation. Notwithstanding the wholly unauthorized statement of a recent president of the American Medical Association that "the next great step in advance would be state medicine," I am convinced that the medical profession will be found absolutely opposed to it just as it was in England and as I believe it to be in Germany. No man can wish to see his profession debauched and himself reduced to the status of a clerk if not of a charlatan.

The next class most concerned is the employers, and these, great and small, have voiced only one sentiment, that of opposition. And, wonderful to relate, the very class which is supposed to benefit by this new brand of paternalism, the worker himself, has recorded his opposition to its introduction. The American Federation of Labor as a body, and Samuel Gompers, its time honored president, have both recorded in unequivocal terms their disapproval.

If the only class that it proposes to benefit declines to be benefitted and the scheme is re-

pugnant to all others immediately concerned, who then is for it? I believe the answer is not far to seek. First, there are the socialists who are blind to the lessons of current history and welcome each step leading toward their impossible ideal; second, those politicians who, like Louis XV, are willing to sacrifice the future of their country to their own present comfort and advantage. Bismarck, as has been stated, frankly admitted his motive in introducing the system into Germany, and my own conviction is that, in forcing it upon the people and the medical profession of Great Britain the motive was more political than humanitarian on the part of the shifty gentleman responsible. If not, his subsequent record shows a deplorable lapse in virtue. And, lastly, there is, in every community, a class of worthy sentimentalists, who, ignoring the inflexible laws of cause and effect, and the limitations set by nature upon every human being, are prepared to reduce all to a dead level, not of opportunity alone, but of condition as well. Their business is "uplifting" and humanity must submit, willing or not. Incidentally it is getting to be a reasonably easy and profitable calling and forms a no mean political potentiality capable of being united with the other governmental employes in seeing that nobody loses his job. Let the process continue and we shall eventually be in the position of the people of the village in which each family lived by taking in the washing of its neighbor.

To conclude: Compulsory health insurance, in its origin is more political than humanitarian; it does not accomplish that which it undertakes, in England, at least, excluding from its provisions many of the most frequent and burdensome illnesses; the service which it renders is mechanical and devoid of the humanizing element; instead of promoting thrift on the part of the insured, it has the opposite effect; it adds greatly to the total expense involved in the field it aims to cover; it creates a great number of new jobs and large funds taken from the public and the wage earners and both subject to the manipulations of the politicians; if sufficiently expanded it will eventually destroy the medical profession, transforming its members into overworked automata, engaged chiefly in rushing from place to place and the performance of clerical work. Where already introduced it has been the forerunner of compulsory accident, maternity, old age and unemployment insurance, the last named the most pernicious and socialistic of all.

It behooves us as physicians and citizens to do our part in seeing that the general public understands the real facts so that when the time for action comes, the outcome will not be determined by ignorance, sentimentalism or the immediate needs of unscrupulous politicians.

JAUNDICE FROM PANCREATIC DISEASE*

CHARLES H. MAYO, M. D.
Rochester, Minn.

In considering jaundice due to pancreatic disease the cases of so-called hemolytic jaundice caused by blood cell pigment stain, a chronic condition in which the spleen is a factor, and the large per cent of the cases of jaundice in which the gallbladder is small and there are stones in the common duct, so well described by Courvoisier, are eliminated at once, even though the pancreas may be secondarily involved. Facts relating to the mechanics of jaundice may be stated briefly.. Bile is formed in the liver and should pass freely through the hepatic duct and the common duct into the intestine. The common and hepatic ducts are joined at their juncture by the cystic duct from the gallbladder, an added reservoir, which normally contains about one ounce, although it is capable of distention, should occasion require, to a capacity of several ounces. Just why man and some animals have gallbladders and others do not is problematic since the exact function of the organ is not yet known. Part of its function evidently is to maintain the stability of tension in the ducts under which the liver secretes bile aud protects itself by the exudate of mucus from its lining. Experimentally, bile from the hepatic duct injected into the pancreatic duct is more irritating than bile from the gallbladder.

In nature no duct delivers directly into a

*Preseted before the Minnesota State Medical Association, Duluth, August, 1921.

viscus, but by sigmoid bends or by passing for a space between the mucous membrane and muscular layers of the viscus so that internal compression may block from backflow while it interferes but little with delivery. It is worthy of note that all tubes or ducts at the point of delivery are closed by muscle rings, while long tubes like the alimentary canal are encircled at each change in structure by automatic muscle rings. Practically all ducts and tubes deliver intermittently through the stimulus of content.

In jaundice, bile in the blood causes staining of the skin, conjunctiva, and tissues, as well as of the urine and unnatural fluids, although the secretion of mucus, milk, and saliva is not affected. The degree of jaundice is comparable with the degree of obstruction. In a study of the manner of the entrance of bile into the blood, Saunders and others experimentally caused jaundice by ligating the common duct of animals but when the chyle duct is ligated first, lymphatic absorption and delivery into the blood are blocked and jaundice does not develop. The absorption of bile depends on the presence of lymphatics in the liver, gallbladder, and ducts, and on the pressure or tension. Any cause which interferes with the delivery of bile into the intestine can cause jaundice, for example: absorption of bile in the liver as a whole or in its parts, caused by new growths. the development of connective tissue with atrophy, cysts, or the obstruction of ducts from within by any inflammatory and temporary swelling of mucous linings as the result of infection, cholangitis; acute or chronic diseases; or definite infections, such as malaria, yellow fever, acute yellow atrophy, and toxic jaundice in general; also from within, by concretions and parasites, and by direct closure from external pressure by enlarged glands or new growths. Anatomically, the common duct grooves the head of the pancreas; it penetrates the outer wall of the duodenum, passes indirectly through the muscle and between muscle and mucous membrane for a short distance, and, just before delivering into the free cavity of the bowel, unites, as a rule, with the pancreatic duct of Wirsung; the secretions from the gallbladder and the pancreas pass through the one outlet.

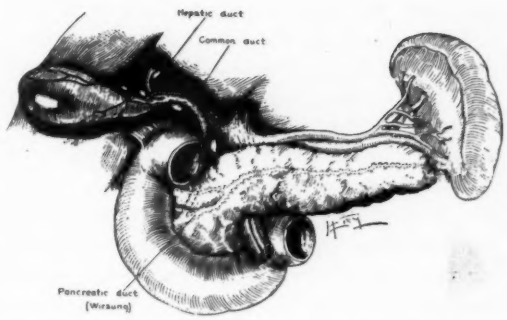

Fig. 1. Distribution of lymph nodes along the course of the cystic, lepatic, and common duct.

The area of the pancreas grooved by the common duct is covered by the duodenum with a more or less intimate attachment extending over one-third of the duodenal circumference. The important feature of this association of ducts is its variability; thus the pancreas may open through the same papilla and the duct be completely separated to the outlet or the two ducts may unite for a considerable distance as one duct. The two ducts, the pancreatic and biliary, may have separate openings, as in many of the lower animals. The usually larger duct of Wirsung may be the smaller, and the duct of Santorini opening between the pylorus and the common duct may be the larger. The two pancreatic ducts may not communicate in the head or in the body of the gland. In considering the relationship between the function of the liver and the delivery of bile in association with the function of the pancreas and the delivery of its secretion, is it possible that the union of the two ducts renders the pancreas more vulnerable to secondary infection following infection of the gallbladder and ducts? The function of the liver is essential; man could live but a few hours without it. Bile is a by-product of great value of the liver function; probably it provides the system, by way of the intestine, with a constant immunity against the temporary dangers that may arise from food and its accidental toxins. It emulsifies fats, lubricates the intestine, and favors peristalsis; its presence is noted by the color it gives the stool. We have observed several cases of jaundice for from many months to several years, in which there was no bile in the

intestine; the retention then of bile is of itself not a cause of death. We have observed the delivery of all the bile to the surface through a fistula for many months or several years; its retention or delivery into the intestine therefore is not necessary to life, not but that such conditions cause serious discomfort.

The condition or conditions which cause jaundice are of great importance in determining methods of treatment and prognosis. Inasmuch as the pancreas partially or completely surrounds the commond duct, any case of jaundice, until differentiated, may be considered as possibly caused by the constriction of the latter. Temporary inflammation, sclerosis, and chronic disease, or new growths may be the cause. In a fairly high percentage of cases the pancreas is involved by varying degrees of inflammation associated with infection of the gallbladder and ducts; such a condition and the size of the lymphatic glands and the common duct should be recorded in all cases of operation on the gallbladder and duct for future reference in case of recurrence of disease.

The pancreatic secretion is of far greater importance than bile from a digestive standpoint, and two ducts were provided for its delivery. It is evident from reviewing the diseases of the pancreas and the surgical procedures developed for their relief that a small part of the normal secretion is sufficient as a hormone or activating agent to give very satisfactory digestive results. Within the pancreas are those very important areas of tissue, the islands of Langerhans, which largely control carbohydrate metabolism. Inflammation of the pancreas is not uncommon; it should undoubtedly be considered a chemical change caused by toxemia from alimentary intake in acute conditions, while subacute and chronic inflammations, which also are chemical in their effect on the tissue, should be looked on as the result of microbic action. From my experience in operations on the gallbladder and ducts and examinations of the pancreas I believe that most of the chronic diseases of the pancreas and a few of the acute diseases are secondary to infections of the gallbladder and ducts, and that a small group of cases of serious acute and chronic infections which cause symptoms do not follow primary gallbladder disease, but that the conditions are reversed.

Disease of the gallbladder is now generally admitted to be the result of chronic infection of its tissues, with possibly, but not necessarily, some secondary infection of its contents., The empyema of total cystic duct obstruction is not caused by the same germs that cause the original cholecystitis. The former conception of infection of the bile and then of the gallbladder from infection reversed through the common duct, or the lymphatics, or the portal circulation by way of the liver, is less plausible than that infection is a direct result of attack through the blood by microbic infractions in the capillaries. While it is admittedly possible that the pancreas can be involved secondarily through the duct association, especially if bile can enter the pancreatic duct, it is more probable, according to modern investigations of routes of infection, that it also occurs through the blood. The more diseased the gallbladder is found to be on exploration the less is the probability that the pancreas is the cause of the trouble, and if it is involved the involvment is secondary: the reverse is true with great distention of the gallbladder and an unobstructed cystic duct.

The usual types of pancreatitis are: (1) the intralobular, in which the inflammatory process chiefly involves the outer part of the lobules, causing a lumpy irregular enlargement of the head or of all of the gland, and only in gross disease involving the islands of Langerhans; (2) interacinar pancreatitis in which the surface is smoother and the enlargement of the gland greater, and in which the diffuse inflammation more often involves the islands of Langerhans and is more commonly associated with glycosuria (the latter type often produces abscesses, and not infrequently is seen with fat necrosis); and (3) hemorrhagic pancreatitis which occurs as an acute condition of the abdomen associated with acute inflammation of the gallbladder and ducts with acute jaundice, but it is a secondary disease from bile in the pancreatic ducts, apparently rendering parts of the gland subject to autodigestion. The pain in some cases of so-called gallbladder disease may be attributed in part

to pancreatic disease as certain characteristics of pain from pancreatic colic are noted in the absence of the gallbladder and without obstruction to the flow of bile. Inflammation of the pancreas may occur with dull pain more or less constant in the region of the pancreas usually attributed to the stomach; the pain is deep, extending to the spine; it may be to the right of the midline in the region of the gallbladder, as well as to the left in the region of the body and tail of the pancreas. With pain may occur an intermittent diarrhea and loss of weight, followed later by jaundice, or jaundice my appear early in a rapidly progressing case; it is probable that in such cases the common duct deeply grooves the pancreas, favoring early obstruction. Such variations of symptoms are noted with cancer of the pancreas.

A large cystic gallbladder with the stone blocking the cystic duct and protruding through and blocking the common duct is a rare but possible finding on exploration, and is one of the few exceptions (Courvoisier) from the usual small gallbladder noted in cases of common duct stone. The result of obstruction of the common duct from the pancreas, aside from jaundice, is pain, indigestion, loss of weight and strength, and occasionally diabetes. The stools are light colored from lack of bile or from the presence of an excess of undigested fats. Chills and fever are not the rule as with infection and gallstones. Physical examination in the early or acute condition usually reveals but little; later an indefinite sense of a deep tumor mass may be felt and often a round tumor to the right of the midline is noted which is probably the distended gallbladder; the liver is enlarged and, if irregular and lumpy, is probably involved by metastasis.

Cancer of the pancreas is usually not rapid in its progress; it extends over many months, and in the early stage jaundice may vary in intensity as bile passes through the duct from time to time.

In milder cases of chronic pancreatitis there is some difference of opinion as to whether the gallbladder should be removed or drained for a long period. Mann's research work shows that removal of the gallbladder greatly lowers the tension within the duct, reducing the spastic closure of the sphincter of Oddi. External drainage of the gallbladder for a period of many weeks may be justified in certain inflammatory conditions of the pancreas. These conditions but rarely cause jaundice for more than a brief period and of mild degree. However, admitting the difficulty of diagnosis, the greatly distended gallbladder with jaundice in middle or old age is more probably associated with malignant disease of the pancreas and many of the symptoms of discomfort are due to the jaundice, theitching, the blood changes, and the loss of bile from the alimentary tract. In such cases cholecystoduodenostomy or cholecystogastrostomy, according to the ease and safety in which either may be made, the former generally being preferable, short-circuits the delivery of bile, gives great relief, and undoubtedly prolongs life. The operation is not advised at a time when hemorrhagic ecchymosis from intense jaundice is noted over the body. Some patients with greatly delayed coagulation time of the blood require special preparation and calcium treatment for a prolonged period, and possibly blood transfusions before and after operation in order to control the serious complication of bleeding which may even occur from the nose and mucous membrane of the alimentary tract. The fistulous opening remains patent only when the obstruction of the common duct is complete and permanent. The relief is most marked in inflammatory disease, and yet life is greatly prolonged and rendered more comfortable in cases of cancer of the pancreas.

X-RAY DIAGNOSIS OF GASTRO-INTESTINAL DISEASES*

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The modern methods of diagnosis in diseases of the gastro-intestinal tract incorporates three main avenues of approach, namely: (1) History, (2) X-ray, (3) Laboratory, whose relative rank of importance may be considered as above enumerated.

The writer does not purpose to foster anything new, but simply to give a resume of present ideas and standards from an x-ray standpoint on this important subject, which has within recent years become a real entity. This is in a large measure due to the manufacture and sale of apparatus for this use, which is dependable and efficient, thanks to manufacturer, electrical engineers and physicists, the latter being represented by such men as Dr. Coolidge of Coolidge tube fame. The usual method of study is by fluoroscopy and radiography combined, as only then can the constant changes in outline which occur with peristalsis, be properly interpreted into a consummate picture. A radiographic exposure, or even several, may show definite filling defects suggestive of pathology, whereas one moment during a screening examination under palpation may produce a normal filling, and thus rule out any such suspected evidence. The radiographic method is necessary to show up constant filling defects and areas of peristaltic absence, with more conclusiveness than the eye can deetect them on the screen. Furthermore, a radiograph serves as a record for comparison in future study and observation of the same case.

The modus operandi consists of introducing an insoluble metallic salt into the alimentary tract by means of suitable suspension media, which according to Pfeffer[1] was first introduced by Professor Bowditch[2] of Harvard in May 1897. The axiom that elements obstruct the passage of x-ray according to their density and atomic weight holds true for the popular use of bismuth and barium compounds in this work, by producing shadows on fluoroscopic screens and x-ray plates, conforming in outline to the alimentary tract in contrast to surrounding organs and tissues.

The routine of examination usually practiced, which was introduced by Haudek and modified by Carman[3], is to furnish the patient in lieu of breakfast a barium meal consisting of about 100 gms. of barium sulphate which he or she is instructed to take in oatmeal or cream of wheat with milk and sugar as desired. This barium is usually furnished on the day previous to the examination with instruction to take at a specific time and to return to the laboratory in six hours, when fluoroscopic and radiographic observations are made consecutively. This is called a double meal test as it serves to obtain: (1) The six hour observation for residue in the stomach, (2) The noting of motility, or location of the head of the barium column, (3) Stomach and duodenal filling and outline; thus combining two examinations and saving one trip to the laboratory. A short resume of the patient's clinical history is always recorded before starting the screening examination to better anticipate what to look for as well as to help make the final interpretation of the shadows present. One should not be too hasty at conclusions, but rather cautious and conservative in the interpretation of what can be seen and demonstrated on the screen and plate. W. J. Mayo[4] has stated that only one person in ten complaining of gastric symptoms has a gastric lesion, which does not mean that the remaining 90 per cent are to be classed as neuropaths, or malingerers, as there are numerous extrinsic pathological conditions which may produce gastro-intestional symptoms, and the roentgenologist should be able to detect them when present and thus help to bring about a true diagnosis. The thorax should always be routinely fluoroscoped before the topic at hand, and the radiagraphs should be studied for evidence of biliary tract, genito-urinary and bone lesions. Newcomb[5] states that hypertrophic bone changes in the spine may produce the whole gamut of signs and symptoms so generally known in cases of so-called indigestion.

The x-ray has taught us that stomach form

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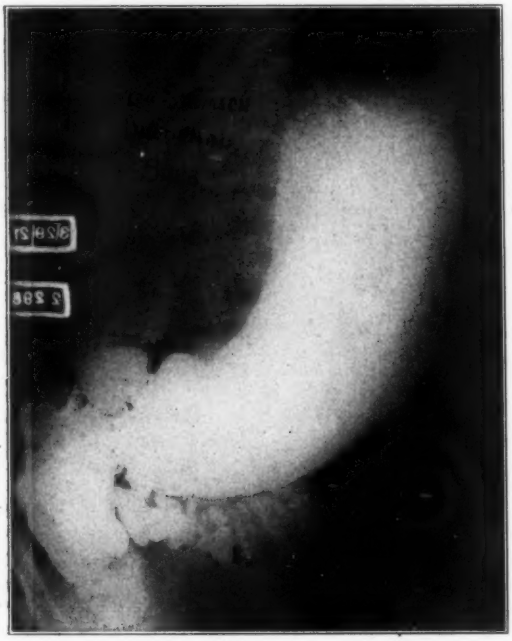
can be variable but normal; for instance, the tall, slim individual may have a stomach which is long and acutely flexed at the distal portion, otherwise known as a fish hook type, whereas, the stout, stocky individual may have a stomach which is more transverse, lying high and known as a steer-horn type. The names are simply descriptive of the shape of these organs and may reach from one extreme to the other. The anatomical land-marks which are routinely observed in gastro-intestinal work are: (1) The esophagus, its contour and peristalsis; (2) The stomach , its pars cardiaca, pars media, pars pylorica, the incisura cardiaca, the incisura angularis, the gas bubble, the pylorus; (3) The duedenum—the bulb, the second and third portion; (4) The appendix in 24, 48 and 72 hours periods; (5) The colon, immediately by injection or at the 24, 48 and 72 hour periods following the barium meal. In examination of the colon we note and observe the cecum, the hepatic flexure, the transverse colon, the splenic flexure, the descending colon, the sigmoid and rectum.

Carman classifies x-ray findings into two groups, direct and indirect. The direct mean a filling defect and are pathognomonic; they show as extrusion, such as a niche or accessory pocket,



1. Normal stomach and duodenal bulb.

2. Esophageal carcinoma showing dilatation above constriction with barium residue.

or may show as intrusion of the lumen of the gut. The latter or indirect findings are known as follows: (1) Abnormal spasticity, (2) Altered peristalsis and motility, (3) Tone interference, (4) Abnormal mobility and flexibility, (5) Presence of localized tenderness. In absence of direct findings the indirect are at times so pronounced that a justifiable diagnosis can be made by them alone.

NORMAL STOMACH

A normal stomach from an x-ray standpoint should present as follows:

1. Motility, showing complete clearance of the barium meal within six hours.

2. Form, usually of fish hook type, occasionally steer horn in the stout, robust individual, or some intermediate grade.

3. Orthotonic, that is, it assumes a vertical form even under moderate distention.

4. Contour, showing sharp outlines with presence of peristalic waves, the presence of the incisura angularis and the incisura cardiaca.

5. Size, normally should hold without particular over-distention from 20 to 24 fluid ounces

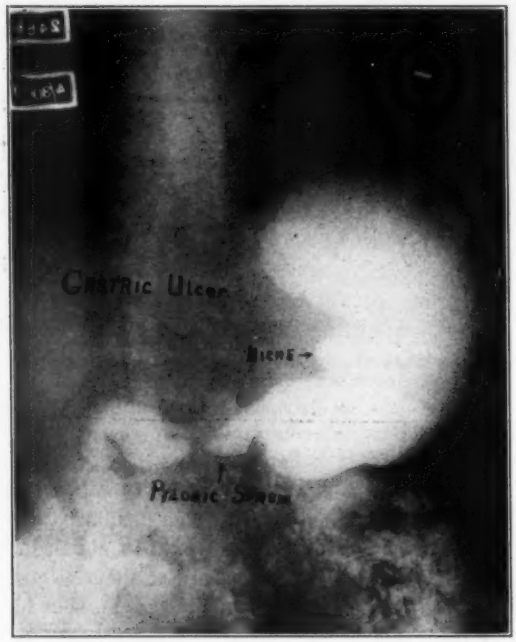
6. Position, varies as the lower border may lie considerably above or below the navel.

7. Mobility, should be present to palpation.

8. Flexibility, that is, it should indent by the pressure of fingers.

9. Peristalsis should always be present and show anywhere from one to three waves at one time; whereas more than this should be considered in the nature of a hyperperistalsis.

The chief gastric, duodenal and appendiceal pathologies may be briefly summarized as follows:



3. Gastric ulcer showing niche on lesser curvature. Note pyloric spasm as an indirect sign.

GASTRIC ULCER

I. Direct Findings:
   1. Niche, or barium-filled crater of a penetrating ulcer.
   2. Accessory pocket, or so-called diverticulum (the cavity of a superficial ulcer.)
   3. Oragnic hour glass stomach.

II. Indirect Findings:
   1. Spastic manifestations;
      a. incisura,
      b. spasmotic hour-glass stomach,
      c. diffuse gastric spasm.
   2. Retention from the six hour meal.
   3. Abnormal peristalsis.
   4. Gastric hypotonus.
   5. Acute fish hook type of stomach.

4. Perforated gastric ulcer on lesser curvature, showing diverticulum with barium residue.

   6. Lessened mobility of stomach.
   7. Localized tenderness.

5. Hour-glass stomach. This case had a gastro-enterostomy performed seven years ago and gives a plus-Wassermann reaction.

6. Gastric carcinoma involving greater curvature of pars cardiaca.

In the presence of hour glass stomach or incisura the tincture of belladonna, 20 minims t. i. d., is given until a dilated pupil with dryness of the throat results. This is given for the purpose of ruling out spasms and thus determining whether or not the lesion is intrinsic or extrinsic.

GASTRIC CARCINOMA

I. Direct Findings:
   1. Filling defects.

II. Indirect Findings:
   1. Abnormality of pyloric function;
      a. gaping of the pylorus,
      b. obstruction of the pylorus.
   2. Abnormal peristalsis;
      a. absence of peristaltic waves from involved areas,
      b. weak peristalsis,
      c. violent peristalsis,
      d. anti-peristalsis,
      e. irregular peristalsis.
   3. Abnormal motility;
      a. rapid emptying (non-obstructive case),
      b. delayed emptying (obstructive case),
   4. Lessened flexibility.
   5. Lessened mobility.
   6. Abnormal size or capacity;
      a. shrinking,
      b. dilatation.
   7. Persistent local spasm.
   8. Displacement.

DUODENAL ULCER

I. Direct Findings:
   1. Deformity of the duodenal bulb,
   2. Diverticulum.

II. Indirect Findings:
   1. Gastric hyperperistalsis,
   2. Gastric retention from the six-hour meal (the combination of hyperperistalsis with the retention and hypermotility is especially significant of duodenal ulcer).
   3. Hypermotility.
   4. Gastric hypotonus in the non-obstructive form.
   5. Gastric hypotonus with dilatation of the antrum and pouching, seen in old obstructive cases.
   6. Gastric spasm, such as spastic hour glass, or transient incisura.
   7. Localized tenderness to pressure over the duodenum.

PATHOLOGICAL APPENDIX

1. Visibility (Skinner[6] states that the appendix normally is visualized up to the age of

7. Gastric carcinoma involving pars pyloric showing a symmetrical narrowing of the pylorus.

8. Duodenal ulcer showing an irregular bulb as well as hyperperistalsis and hypermotility, the barium head having reached the sigmoid in six hours.

10. Duodenal ulcer showing branch deformity of the bulb together with a diverticulum, which showed waving fluid under palpation during fluoroscopy.

9. Duodenal ulcer, obstructive type, showing markedly enlarged stomach due to gradual distention. The duodenal bulb could not be visualized.

11. Gall stones with hypermotility, the barium head barium head being in descending colon in six hours.

12. Carcinoma of the colon showing almost complete obstruction directly beneath the splenic flexure. This plate was taken 30 hours following a barium meal.

thirty and when noted past this age period it should be considered indicative of chronic disease);

a. regularity or irregularity of lumen,
b. movability or fixation,
c. presence of kinks.
d. tenderness to pressure.

2. Fixation and tenderness over the terminal ileum (Eastmond[7] states that in pathological appendix the terminal ileum is adherent and fails to hold barium evenly. Previous incidence of typhoidal infection must be ruled out.
3. Cecum;
   a. dilatation,
   b. fixed or freely movable,
   c. tenderness to pressure.
4. Relative ileal stasis, (Alvarez[8] states that the gradient or stimulated anti-peristalsis of the terminal ileum in cecal pathology can produce ileal stasis).
5. Presence or absence of gastric residue in six hours.
6. Presence or absence of hypermotility.

CONCLUSIONS

1. X-ray diagnosis in diseases of the gastro-intestinal tract is efficient and reliable.

2. Resumes of the clinical history should always be associated in making final diagnosis.

3. Preliminary examination of the chest before screening of the abdomen should be made to rule out pathological thorax.

4. Extrinsic pathology such as genito-urinary, gall bladder and bone lesions must always be considered when present and associated with symptoms of so-called indigestion.

5. Variation in stomach position and tone are factors which may influence the pathology present.

6. Anatomical gastro-intestinal landmarks should be noted in all examinations.

7. X-ray findings are divided into two groups, namely—direct and indirect.

8. Routine daily examinations until colon is empty is good technique.

13. Carcinoma of the sigmoid.

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4. Carman: The Roentgen Diagnosis of Diseases of The Alimentary Canal, Second Edition, Page 38.
5. Newcomet: Arthritic Changes in The Spine. Their Relation to The Roentgenologic Study of

14. Colitis of two years duration involving descending colon and sigmoid showing absence of haustration as well as narrowing of the lumen of gut.

15. Non-rotation of colon, cecum, ascending colon (A. C.) transverse colon (T.C.) descending colon (D. C.) all on the left side.

16. Pathological appendix, showing segmentation. The appendix was fixed and tender to palpation. Subject was a male, age 45, with long standing gastro-intestinal symptoms.

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DISCUSSION

DR. A. B. MOORE, Rochester: I have enjoyed Dr. Nessa's paper very much; he has covered the territory thoroughly and all that I can do is to further emphasize some of the most important points.

I think that one of the strongest features of his paper is his emphasis of the principle that the roentgen examination is but one link in the chain of evidence in gastro-intestinal diagnosis; this is a point on which too great emphasis can not be placed.

The technic described by Dr. Nessa is the one which we employ at the Mayo Clinic, namely; the six-hour motor-meal as a test for gastric retention; careful fluoroscopic examination of the stomach and duodenum after the ingestion of an aqueous solution of barium in search of filling defects and deform-

ities of these viscera; and the making of two or more roentgenographs as further evidence.

The most common of the lesions of the stomach to be frequently overlooked probably are those situated at or near the cardia. Many of these may be discovered by carefully watching the liquid solution as it enters the stomach, angulations and distortions of the lower end of the esophagus being valuable indices of a lesion at the cardia.

Careful and thorough palpation of the stomach and duodenum under the fluorescent screen is essential as only by this method may lesions of the posterior wall be discovered.

As Dr. Nessa has stated the diagnosis of duodenal ulcer is based largely on cap-deformity, although the value of hyperperistalsis and six-hour retention must not be overlooked. Cap-deformity is chiefly due to a spasmodic contraction, distinct craters being uncommon in ulcers of the duodenum. While adhesions may deform the duodenal cap, thereby simulating the deformity due to an ulcer, in our experience this is rare. In doubtful cases we have found that a second roentgen examination after the administration of belladonna is a valuable method of excluding deformities due to some reflex spasm.

At the present time we feel that the roentgen examination of the gall-blabber is of little value, the evidence being indirect and indefinite.

Authorities differ materially in their opinions as to what constitutes the roentgen evidence of appendicitis. Personally I feel that, aside from demonstrating abnormal locations of the appendix, the roentgen rays contribute little information that can not be obtained by other methods of examination.

DR. F. S. BISSELL, Minneapolis: The essayist and Dr. Moore have so thoroughly covered the field that there is very little left for me to say. I would like, however, to devote the first part of my discussion to that type of case which the roentgenologist meets quite frequently, in which there is a definite ulcer history, more or less typical, and in which no evidence is found on intragastric examination. That, to me, has been one of the daily problems met in gastro-intestinal x-ray work. Doubtless we have to consider a certain number of ulcers which give no roentgen signs. To study this problem in terms of percentage would be impossible because the surgeon very properly does not open many of these stomachs. That there are ulcers which do not produce the slightest niche or which give no indirect signs is difficult to prove. Then again, there are extrinsic conditions which give pretty good ulcer histories. Among these, I think a fair percentage are in the upper right quadrant, gall-bladder cases. Perhaps we are a little derelict in our duty in not laying enough emphasis on the study of the gall-bladder region in gastric cases. I believe if we study thoroughly and carefully all cases that come through our hands, we would be able to diagnose very many more cases than we have in the past. This "neglect to try" is a source of frequent error. We feel that because we are not able to demonstrate gall-stones in a number of instances, there is no need of following these cases through. Dr. Nessa has brought out, and Dr. Moore has emphasized the importance of history in the study of these cases. I see no reason why the roentgenologist should ignore the history of a case any more than the internist or pathologist should ignore it. A pathologist must have a history of a case before he will study the specimen, and it is important that the roentgenologist should have a history of the case and proceed with his diagnosis as an internist or any other diagnostician would proceed, that is, by exclusion. If we have a definite case history and proceed in that way, very often we can arrive at a diagnosis based upon objective roentgen evidence which might have escaped detection.

I was surprised to hear Dr. Moore's statement that he attaches very little importance to duodenal cap deformities due to gall-bladder involvement. Whether they are due to spasm or adhesions it is difficult to say, but certainly it is not an uncommon thing to have cap deformities which are not typical of ulcers and which are undoubtedly caused by gall-bladder disease. I confess that I have seen cases, such as Dr. Moore describes, with the duodenum surrounded by gall-bladder adhesions, where the duodenum appeared perfectly normal on the screen or plate, but where one comes across one such case as that, there are many cases which show a definite cap deformity due to gall-bladder disease.

With reference to the appendix, I have been through the same gamut of optimism and pessimism, and I must confess I know as little about it as I did several years ago.

I cannot agree with the essayist that all cases beyond 30 years of age which do not fill are pathologic; neither can I agree, as far as my observation goes, with the statement made by Dr. George in his textbook that any normal appendix will fill. It seems to me, there is no definite rule to follow. If we have an appendix which fills and remains filled after the rest of the intestinal tract is emptied, and an adherent tip, we are justified in making a diagnosis. It is one thing to make a diagnosis of a pathological appendix a safe diagnosis since the pathologist will always confirm it; and quite another to make a diagnosis of appendicitis, meaning that if that appendix is removed, the patient's symptoms will clear up,—or, in other words, that it is a symptom-producing appendix.

POTTER VERSION*

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For quite a number of years it has been my observation that the length of time it takes to deliver the ordinary obstetrical case, and more particularly the second stage, has been increasing; also the number of cases that have required some instrumental delivery on account of inertia and fatigue has increased. This has been noted not only in primiparae but also in multiparae, until I have become convinced that the observation of Dr. de Lee and others that the delivery of the ordinary obstetrical patient is becoming more and more a pathological process instead of a perfectly normal, physiological one, is correct.

I have also been impressed with the fact that the number of forceps cases is on the increase, and accompanying these forceps cases, at least in my hands, tears have been more or less frequent, some of them of quite a severe degree, particularly tears of the upper vault of the vagina and also of its lateral walls. Many of these tears I am certain occur with other practitioners, and I am also sure have been overlooked in the past, and that the perineum itself has been the only part that has been examined for tears, and that more or less superficially. When one carefully examines these cases after forceps, getting in a good light, and going over the entire vagina, the number of lacerations is certainly appalling with the forceps operations even in the best of hands, so that when the method of doing versions as devised by Dr. Irving W. Potter of Buffalo, N. Y., was brought to my attention, and after reading his several papers upon this subject, more particularly as to his method of delivery, the time and the indications, I decided to try it out on a series of cases and see if my results would come up to observations.

I am prepared to state that I believe that the Potter method of doing versions is one of the greatest advances in obstetrics during the last decade.

*Presented before the Minnesota State Medical Association, Duluth, Minn., August 1921.

The question of the alleviation of pain during the second stage of labor, and in some degree during the first stage, is one of the demands of modern obstetrics. Heretofore we have attempted to relieve it by the use of chloroform, ether or gas. Then came "twilight sleep," which never did get a very strong hold, and later shortening the process of the second stage by the use of forceps came into vogue. Now we have the Potter version, which I believe will meet this demand better than anything else that we have tried so far. Needless to say, Dr. Potter is a master of the art of doing this version, and it is from him that we must learn the method. In order to place his method before you I will attempt to give you concisely the essential rules that he lays down:

When you have satisfied yourself that the cervix is completely dilated or completely dilatable, the patient is pulled down to the end of the table, or, if in the home, laid crossways on the bed. The feet and legs are put in a modified Walcher position, i. e. not in extreme Walcher but a position about halfway, so that they hang over the edge of the bed or table. The parts are thoroughly scrubbed with soap and then thoroughly rinsed; shaving the vulva is a matter of choice. Needless to say, the operator should prepare as for any surgical operation. The best rubber gloves to use are those of elbow length, so as to carry out as aseptic a procedure as possible.

The first step is the kneading out of the perineum. With the palm of the hand full of sterile green soap, the perineum is kneaded out first by inserting two fingers and stretching down, gradually kneading out the levator ani muscles on either side, then three fingers, and then four, until you are able to put your entire hand inside of the vagina. When you have done this, then you may knead the perineum out until the hands slides out easily. This can be done without any lacerations. It is understood that the patient has been previously completely anesthetized with chloroform or ether, my preference being ether; Dr. Potter prefers chloroform. After having thoroughly kneaded out the perineum, so that it is patulous (and this can be done even with the most rigid perineums with an ease and thoroughness that is surprising),

then insert the hand up into the uterus through the dilated cervix, and if the membranes have not previously ruptured you swing your hand around the uterus and rupture the membranes high up, first having ascertained the position of the head. After rupturing the membranes you catch the feet in your hand and attempt to pull both of them down. When the knees are out of the vulva the baby turns, and the version is complete.

Gentle but firm traction is then made by placing one hand on the lower thigh, and the other hand on the upper foot, until the navel is delivered. The cord is then pulled down a trifle so as to be sure that it is not impinged upon and pulsation can be felt. Next, by firm and steady traction, keeping the shoulder under the symphysis, deliver the anterior shoulder. Traction is then made until the shoulder blade or scapula is entirely under the pubes, and then the arm is very easily delivered. The baby is then rotated until the other shoulder and arm are delivered anteriorly. This point is very important, and is quite a radical change from former methods. This prevents lacerations of soft parts.

After both arms are delivered, which is usually surprisingly easy to do, the fingers of the operator's hand are placed in the child's mouth, and pressure made upon the head just above the symphysis. Ocassionally it may be necessary to have an assistant press upon the head, but usually you can handle it yourself, and if you do, you can regulate the pressure and the amount of flexion very much better. The object in placing the fingers in the mouth is to maintain flexion by pulling down the chin, so that the head will slip over the perienum very much easier. Heretofore, in my experience, this has been the most ticklish part of the version, but after being inspired with confidence by Dr. Potter's articles, it has now become a comparatively simple procedure. Gentle but firm traction is made with the fingers in the mouth until the mouth is delivered. The mucus is then swept out of the throat. We do not have to worry. The heart is beating, and the mouth is open so that the baby can breathe if necessary. Delivery of the rest of the head should be very slow, and the pressure on the aftercoming head, with traction upon the mouth, should be well regulated, so as not to let the head slip through too quickly; otherwise, of course, a tear may result. The only object here is to maintain flexion. If extension is obtained, of course the difficulties are very much increased; it may be even necessary to apply the forceps to the aftercoming head, but if one has dilated the perienum properly this is not a hard procedure, and can easily be handled. The greatest temptation one has in this stage of labor is to be in a hurry, but haste is not necessary, and much is to be gained by going very slowly. You may take from five to twenty minutes or more to deliver after the version is done.

After the baby is delivered, Dr. Potter then gives a hypo of pituitrin to help in the delivery of the placenta. However, my experience has been that this is not necessary, and that by pressure upon the uterus the contractions very soon take place, and there has been at no time any evidence of hemorrhage that was in any way alarming.

For a long time I have been convinced that in the resuscitation of babies many of them are injured by the hard patting upon the back, immersion in hot and cold water, by the use of the pulmotor or artificial respiration by any method devised. Even before Potter's article appeared I had formed the habit of gently blowing upon the baby or else laying the baby aside, as long as the heart was beating, as I felt quite sure it would breathe within a very short time. This has also been brought out very markedly after version. Many of these babies do not breathe vigorously at first, but if the heart is beating one can lay them aside, and within five or ten minutes we will find them crying, and far better babies than they would be from spanking too much. Of course this is due a great deal to the fact that the baby itself is practically completely anesthetized, the mother of course being completely so. One would not think of spanking an adult who had been given ether in order to revive him, so why should we do it in these cases.

The perineum has been very carefully examined in all of our cases, the percentage of tears has been remarkably less than in any

previous series of cases we have had. Examination of these patients six weeks to two months later has convinced us that the perineums are very much firmer and in far better shape than after the ordinary delivery, in which we had during the second stage long continued pressure on the perienum. Comparing cases of the two methods, in neither of which there were tears, the version cases have better perineums. The end result is decidedly improved over previous experience.

Needless to say, all is not smooth and easy in doing these cases, and there are some difficulties which one can run into which it would be well to speak about:

(1) In a patient whose membranes have ruptured prematurely, and who has been long in labor, you will find it very much more difficult to do a version. However, if the patient is completely anesthetized, the difficulty will be very much lessened. In one of our cases there was such a marked Bandl contraction ring that it was impossible to do a version, and forceps had to be applied.

(2) An impacted head sometimes gives considerable difficulty. I would not say that in all cases in which the head becomes firmly wedged in the pelvis that it would be advisable to do a version, and forceps may be preferable. In all these cases, of course the question of relative size of the passenger and the passageway—all questions of experience and observation—would have to be thrashed out with one's own self.

(3) There are some slight observations to be made on the details of the methods persued:

I have been able to use comparatively short gloves and steril gowns and get away with versions fairly well, but you would do very much better to have elbow length gloves.

The question of dilation of the cervix: If the cervix is completely dilatable version can be done with safety. The steady pull upon the feet also has a tendency to dilate the cervix very gradually, and is much better than the use of bags or anything of that kind.

Catheterization of the patient before version is attempted is very essential. This procedure is not only essential in versions but in all obstetrical cases. I believe it is a very large factor in the prevention of traumatism or tearing of the uro-genital triangle, and if catheterization is insisted upon the question of cystocele will be a very much less frequent one than at the present time.

As to the position of the fetus, we have found that twenty-five per cent of the cases are R. O. P. Textbook statistics on positions of the head when engaged are wrong, i. e. L. O. A. does not occur as frequently as they would lead you to believe. In breech cases, or coming breech, with the buttocks or with one foot, I am firmly convinced that it is better to change that into both feet down and deliver (as a Potter version), than to wait for the long, slow delivery that a breech case generally entails. Too, the question of delivering by Potter method of inserting the finger into the mouth and keeping up flexion, is very much to be desired over a possible extension of the head with all its attending difficulties. Delivery of the shoulder and the arm anteriorly, and then rotating and delivering the other anteriorly, is a very decided step in advance of the methods of doing a version.

The question has arisen as to whether there are apt to be more fractures of extremities than by the other methods. We have had no fractures in our series. I firmly believe, however, that the possibilities of fracture, etc., are very much less with this method than with the old method.

The question of pressure on the head: The only time that you should use any pressure at all in delivering the aftercoming head is after the arms have been delivered. If done before this time you are apt to shove the head down in between the extended arms, and then your difficulties certainly will increase. No pressure should be made upon the head at any stage until after the arms are delivered; then, of course, it is quite essential. I believe, however, that it is still better to make your pressure rather downward and crowding under the symphysis than to press hard from above. When the mouth is delivered you can feel perfectly safe that everything else is going to come along all right, the baby will breathe, and you can feel very comfortable at this stage.

Potter is of the opinion that cord complica-

tions cause more stillborn births than any other single complication. He even is bold enough to ligate the cord before delivering the head in some of his cases in which he is quite sure that the cord is too tightly wound about the neck. His observation that a white baby is more to be feared than a blue one is perfectly true.

My own experience may be summed up in my last one hundred and forty-five cases:

Fifty-two of them have been Potter versions; thirty-four of the fifty-two were primiparae, and eighteen multiparae. I found L. O. A. presentations in thirty-five cases; thirteen cases were R. O. P., and four cases R. O. A.

The infant mortality in this series of cases has been four babies dying within two weeks after birth.

The first infant fatality was in a patient 40 years old, primipara, in labor twenty-four hours. After being two and one-half hours in the second stage of labor, forceps being rather difficult, attempted to do a Potter version. There was no trouble in doing the version, but the head was exceedingly hard to deliver. Delivered with considerable laceration. The baby was born alive, and lived twenty-four hours. The cause of death was not ascertained, autopsy not being obtainable, but apparently it went out with some sort of cerebral irritation.

The next case was one in a patient 32 years of age. In labor twenty-four hours. Dry birth, as in the previous case. Version was attempted after the cervix was completely dilated, but a very marked Bandl's contraction ring was found. The anesthesia was not as good as it might have been. With a great deal of difficulty a version was done, and baby delivered, but baby was stillborn.

These two cases were early ones in the series, and I am quite sure that my judgment now would be a little different in the handling of these cases, and that I would not attempt a version, but either do a forceps or a Cesarean section. Both cases were rather rigid types of pelves, with dry labors, extending over a period of twenty-four hours, and both babies much larger than the ordinary for primiparae.

The third case was one in which the version was comparatively simple. The baby was quite large. The baby died in spite of everything that could be done to make it breathe. It evidently went out with some irritation of the meninges, as there were convulsions, twitchings, and spastic irritation of the nerves affecting the lower jaw and the left eyebrow. Spinal puncture was negative.

The fourth case was one of twins, which were not well developed, the mother having been sick throughout the entire pregnancy, and the baby died from melena.

However, the rest of the babies have been very fine babies, the heads not molded, no evidence of any convulsions, and they have all done very well.

I have not had time to run down the temperatures in these newborns, but the general impression seems to be that babies on which you do a version and save the extremely hard molding that accompanies the delivery of the normal baby, have less temperature than those in which forceps or long second stage pains have had a chance to mold the head. However, we have not been able to check this properly before going on record.

Now, as to the condition of the mothers: Tears that have been sustained in all the cases have practically been of very mild degree, except these few in which the babies happened to die, and in which the case was very hard to deliver, generally requiring only one catgut or silkwormgut stitch in order to stitch the fourchette. The degree of laceration is certainly very much less than in the previous cases in which forceps were used or in which the patient was allowed to terminate the pregnancy spontaneously.

Mothers, as a rule, the day following the delivery, are fresh, happy, and in no degree have they been fatigued as in those cases delivered in the other ways.

There has been no maternal mortality. The maternal morbidity shows one patient with a temperature of 101° on the fourth day only, a patient with 100° on the first day, and a patient who ran a temperature from the eighth day to the end of the third week, and had an infection of the tubes, subsiding spontaneously. One patient ran a temperature from a definite pyelocystitis, which was present before delivery. Another patient ran a temperature from a

definite mastitis. All the rest have had normal temperatures throughout their puerperium. This is an exceedingly low morbidity temperature record, and certainly should speak well for the method used. This record is very good proof that the danger to be feared from putting the hand up into the uterus, if done under proper surgical conditions, is of no consequence whatsoever.

The question has been raised as to whether Potter version should be advocated or taught to students. I am firmly convinced that the old method of doing versions is obsolete, and that this new method of doing versions should be taught and demonstrated to students. It is not hard to do, and if done under proper conditions should not offer more complications or as many as using forceps. I would not advocate that Potter version be done in all cases arriving at the second stage, but I still believe that there is a very definite indication for it in second stage labor, and that it has very many advantages.

(1) Our observations and those of others have been that Potter version, with proper kneading out of the perineum, does protect the maternal soft parts.

(2) The morbidity is decidedly lessened on account of the fact that the patient is saved the second stage of labor and the fatigue that goes with it, so that she is better able to resist infection.

(3) There is no question but that the patients are exceedingly pleased with the way in which their cases are handled when they are able to escape the pain of the second stage.

(4) I feel certain that the maternal and infant mortality will be a great deal less when this method is better known.

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DISCUSSION

DR. L. W. BARRY, St. Paul: With a normal pelvis, the bag of waters unruptured, complete dilatation of the cervix and deep anesthesia, podalic version is comparatively easy in skilled hands. Not every one can do a version and do it quickly and properly. If the practitioner will measure his pelvis carefully and determine whether he has a flat or a contracted pelvis to deal with, he will not do a version in every case. Why? Because nature is very wise. If the child comes head first, the slow moulding of the head and overlapping of the cranial bones will lessen the tendency to sudden tearing of the subdural veins and thus materially lessen the occurrence of intracranial hemorrhage.

The fetal mortality with Potter version is liable to be very high. If one is not careful about measuring the pelvis he will do versions in cases with a slight contraction of the pelvis. According to Williams, we have a variation of between 6 to 13 per cent of contracted pelves and the majority of these are of a mild degree and very difficult of recognition. If a version is done in one of these cases, the sudden compression of the fetal head coming through the brim will tear the delicate intracranial veins, with resultant hemorrhage. This is true in normal breech deliveries with a fetal mortality of between 6 and 33 per cent.

Another point about the Potter version: If one attempts it when the bag of waters has partially drained away, he will find that he has a difficult proposition with which to deal, especially if the child is large. One should not become too enthusiastic about the Potter version. The man who attempts a version in every case will have a high fetal mortality. Carter reports a fetal mortality of 16 per cent with the Potter version. The fetal mortality will correspond to the number of cases of contracted pelves and the skill of the operator. Potter reports a fetal mortality of 8 per cent and he is a master of his own technic. How much greater will be the mortality in the hands of novices?

Finally: It is very important to measure the pelvis before doing a Potter version, due to danger of sudden compression of the head, with resulting intracranial hemorrhage. Be certain that you have plenty of fluid in the uterus. I have seen two cases in which rupture of the uterus had occurred after the rupture of the bag of waters and the development of a contraction ring. In pushing up the fetal head and turning the body of the child the thinned out lower uterine segment was ruptured, the woman dying of hemorrhage and shock. I think chloroform is the best anesthetic if complete relaxation is desired. Have a trained anesthetist. I have attempted to do a version with a nurse giving the anesthetic and found when I got my hand into the uterus, the uterus would contract and render version almost impossible. Deep anesthesia is very essential to an easy version.

As to the Potter technic of ironing out the perineum: It is a good procedure but a well executed episiotomy will allow a surprisingly easy birth of the after-coming head.

As to getting both feet: At times in a version one is very glad to get one foot. If you can easily get both feet do so; if you cannot, take any foot you can get.

I cannot recommend a Potter version in every

case simply to save pain, but I do think it a good procedure in the case of a prolapsed cord, or where the fetal heart is going bad. One could recommend it in cases of persistent occiput posterior positions in primiparæ, but unfortunately in a great many cases of posterior positions labor begins by a rupture of the membranes. These women stay in labor a long time and when the cervix is dilated the amniotic fluid may be drained away to such a degree as to render a version very difficult or even impossible.

In multiparæ when the cervix is dilated, by rupturing the bag of waters and giving 3 to 5 drops of pituitrin I can get the baby before the nurses have time to drape the patient.

DR. JAMES ROLLIN MANLEY, Duluth: I want to say a few words in support of this method. I had an opportunity a year or so ago of visiting Dr. Potter and of seeing him do several of his versions. I have had a personal experience of some 15 cases, and I want to give you my impressions.

There is no question but what Dr. Potter has given the profession a valuable method of delivery. Like every new thing brought out, it will be abused, and it will be done when it should not be considered. But if the cases are gone over carefully and the proper ones selected for version, we are going to prevent a great deal of pain and suffering in the second stage of labor.

Dr. Coventry has described Dr. Potter's method very clearly and has told exactly how he does version. Dr. Potter is very kind and courteous. When any one goes to Buffalo he takes him around and allows him to examine the cases, and he answers all questions you want to ask. It is true, that in a certain number of cases of contracted pelvis version should not be used. Dr. Potter gets around that by doing a Cesarean section. He does eight per cent Cesarean sections. In 1100 cases, he did 80 Cesarean sections, and if he does not do version he does the Cesarean operation. Most of us would use forceps on a good many of these cases. He is extremely deliberate in his work.

The first case I saw him do a version on was a primipara. The cervix was fully dilated, and he allowed me to examine her, and she had an apparently normal pelvis. He got the feet down as Dr. Coventry described. He got down to the navel, and I timed him, and I became very nervous standing around. I was inclined to tell him to hurry up. I was afraid he might lose the case. It took him fourteen minutes to deliver from the navel until he got the head. Down in New York they told me that if you should see the baby begin to breathe before the head is born, do not advise Potter that it is breathing. He is waiting for you to say the baby is trying to breathe. He says that these babies are not breathing; they have spasms of the diaphragm, and they do not get any mucus in the throat. He says that babies stand asphyxia better than they stand a broken neck. The reason for the mortality in versions is due to too great pulling on the body and the babies are born absolutely dead. Potter said he would rather take chances on asphyxia than injuries to the cord. There is no question but what the lacerations are less, and there is absolutely no more fever or danger than in the old methods of delivery. My personal experience has borne that out.

I think the contraindications, as stated by Dr. Coventry and Dr. Barry, are true. I do not attempt version in a small pelvis or in a case where I think it is going to be very hard, but in normal cases you can deliver the women easily and save them a great deal of suffering.

I have had no fetal mortality except in one case, and I do not blame the version for it. It was a prolapsed cord when I saw the case and I could not feel any pulsation.

DR. ROBERT EMMETT FARR, Minneapolis: I had the pleasure and privilege of hearing Dr. Potter read three papers on this subject. I was not especially interested in the technic, but I was interested from the standpoint of the prevention of pain. Pain is a very good thing to call attention to what is taking place in the human body, but if there is any way of stopping it, that is compatible with good treatment, we should consider it.

Dr. Potter read these papers before the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, an organization composed of some excellent men, many of them holding professorships in our leading universities.

When Dr. Potter first presented this subject he was considered extremely radical, and there was a feeling among many of the men that he should be dropped from the organization. However, upon visiting his clinic and seeing him work, the sentiment has entirely changed. The second paper he read was received with much more approbation, while his last paper received almost no criticism. It is a noteworthy fact that those who have seen Potter work do not continue to criticise him adversely. Most of them seem to think that with his limitations the method is good.

I rise, therefore, to ask you to keep your minds open in regard to this matter until we know more about it. I have been a propagandist myself, and I know what one has to go through. If the subject is sufficiently important, I believe that the critics of the method should see it under the best of auspices before condemning it.

DR. W. H. MAGIE, Duluth: As Dr. Farr remarks, I also do not claim to know much about the subject of obstetrics. However, I do know, or think I know, that if God Almighty though it better to have children born feet first, he would have planned it that way. Nature intended that the force was to be applied above and the child pushed out. Potter's method directs that the child be pulled out. Dr. Farr says that one of the advantages is that it is a painless delivery. I would like to ask him upon what he bases the claim

that it is a painless delivery. It is painless because the patient is anesthetized. In the practice of obstetrics, I have found that a large percentage of my cases, if I did not hurry, were delivered by the time I arrived. As I understand it, these cases are to be treated by Potter's method in spite of the fact that if left alone they would have been delivered by nature's method. We have fads in medicine and surgery. This is a fad and will soon be cast aside with many others. Only a few years ago there was a fad for delivering babies through the belly. We had at least one instance in Duluth where the physician, who was anxious to have the reputation of having done a Cesarean section, undertook the operation in one of our hospitals and the patient died upon the operating table. This woman had given birth to five children in the normal way. I know of another case that occurred in Duluth hospital, where the nurses were preparing the patient for Cesarean section and the patient was on the operating table when the nurse discovered that the baby was about to be born. She exclaimed, "If you don't hurry up doctor, the child will be born" and it was born in a short time in the natural way.

DR. WILLIAM A. COVENTRY, Duluth (closing): I have only a few words to add to what I have already said. It is needless to say that we examine all pelves and know what we are doing. If you do not get any other thought from this paper except the method of doing a Potter version, I shall feel amply repaid. You can work out the rest of it for yourselves.

My experience in observing doctors in different parts of the country has been that when they come to do version they blow up, so to speak. It is done as a last resort. They pull and yank and tear the baby all to pieces. I do not advocate version in all cases, but when I think it is indicated I do not hesitate to do it.

BLOOD TRANSFUSION WITH SPECIAL REFERENCE TO THE SODIUM CITRATE METHOD*

MAX H. HOFFMAN, M. D.

History, Review of Literature, Report of Transfusions, Cases, and Results.

Although blood transfusion is supposed to be a relatively late accomplishment, writers on its history find many references pertaining to that procedure in the Bible, the manuscripts of the ancient Egyptians, and in the writings of the early Greeks and Romans.

Ovid, in his Metamorphosis, Book Seven, is quoted by McClure and Dunn[18] as saying, "Why now do ye hesitate and do nothing? Unsheath your sword, and draw out the old blood that I may fill the empty veins with the blood of youth."

In the same year that Columbus sailed to America, the physician, Savanarola, is said to have transfused Pope Innocent the VIII. The three youths who were used as donors, according to records, died as the result of getting air into their veins, while the Pope received no benefit.

Libavius, in 1615, did an artery to artery transfusion by means of a silver tube. In 1667, a Frenchman, Jean Baptiste Denys of Montpelier, transfused blood from the veins of a lamb to those of a young man. This is the first really authentic record of the transfusion of blood into a human being.

So it appears that before Harvey discovered the circulation of the blood (1616), transfusions had been performed. At about the same time, Lower, in England, transfused blood from the carotid artery of one dog to the jugular vein of another by means of a quill. He also experimented with anticoagulants.

In the eighteenth century much work was done in the perfection of blood transfusion in Germany. Landois[12] devised a method of vein to vein transfusion by means of cannulae and tubing.

In the United States, Halstead did refusions in cases of carbon monoxide poisoning, i.e., he withdrew blood, defibrinated it, and reinjected what was left. This method was later abandoned.

DEVELOPMENT OF TECHNIQUE

In 1892, von Ziemssen[36] devised the syringe and cannula system for the injection of whole blood. He was also the first to note the effect of transfusion on anemias. His original method was modified many times; by Lindeman[13] in 1914, and Unger[33 34] in 1915. The latter method has proven to be a definite advance over the other syringe cannula systems.

Carrell and Crile attempted to improve on the above indirect methods, by affecting a method of direct approximation of the blood vessels of the donor and the recipient. The objection to this method is that its use is accom-

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panied by many difficulties; and it is successful only in the hands of deft surgeons.

Another method which at the present time is used by many surgeons, is the one in which blood is allowed to run into paraffin coated tubes by means of a cannula placed in the isolated vein of the donor. The vein of the recipient is exposed, and the blood is injected into it. The objection to this method is that the veins of both donor and recipient are rendered useless for any further transfusions.

The most important advance in transfusion was made possible, not by means of new mechanical devices, but by the use of chemical substances.

In 1914, Satterlee and Hooker[30] first reported the use of hirudin with good results. Later, they advised against its use on account of the uncertainty of its action and the possibility of contamination by toxic substances. Prior to this, Engleman[6] reported the administration of .3 gram doses of hirudin in cases of eclampties without any toxic symptoms. In the hands of others, this drug has caused many accidents and its use has been abandoned.

Many other anticoagulants have been tried, such as magnesium sulphate, sodium tartrate, sodium metaphosphate, sodium oxalate, and sodium citrate. Of these, sodium citrate has proven to be the best.

The anticoagulation properties of sodium citrate were known long before it was made use of in blood transfusions. Several men claim priority for its use for this purpose; but the credit is generally conceded to Hustin[9] of Belgium, who described this method in April 1914.

Weil,[37] in this country, read a paper on the same subject in December of the same year without any knowledge of Hustin's work, and in the following year Lewisohn,[17] in January, and Rueck,[27 28] in February, also claimed priority.

A considerable amount of investigation has been made to determine the optimum amount of sodium citrate which will prevent coagulation, and also to determine the smallest amount which would give toxic symptoms.

The drug has been given intravenously in doses as high as 5 grams without producing any toxic effect whatsoever. A solution as low as 0.2 per cent is sufficient to prevent coagulation.

The action of sodium citrate as an anticoagulant is explained by the formation of a double calcium salt which in vitro inactivates the calcium and thus prevents coagulation.[31]

A peculiar phenomenon which has not been explained is the fact that in vivo it shortens coagulation time. Weil found that 5 grams of sodium citrate shortened coagulation time by one half.

Recently it has been used in thrombo phlebitis and in thrombo-angeitis obliterans,[32] on the supopsition that it lengthens coagulation time, and thus decreases the tendency to further thrombus formation. But, as Weil has shown, it shortens coagulation time in vivo.

Several extensive investigations have been made to determine its toxicity and the rate and manner of its excretion. Battelli and Stern[2] believe that it is entirely oxidized in the tissues. Most of their experiments were performed in vitro, and they found that the freshest tissues oxidized sodium citrate faster than the old ones.

Salant[29] and Wise, using cats and rabbits as experimental animals, found that sodium citrate disappeared very rapidly from the circulation. As much as 70 per cent disappeared during the first half a minute; and 10 to 20 percent was lost during the next 20 minutes.

In cases where the amount injected was more than .5 grams per kilo, a considerable percentage was recovered in the urine. If doses of less than .5 grams per kilo, none of the salt was found in the urine. Salant and Wise concluded from their investigations that sodium citrate is oxidized mainly in the blood, and that its toxicity depends on the ratio of the rate of injection to that of excretion. They found that it required 67 milligrams per kilo of body weight to produce definite toxic symptoms.

An interesting fact brought out in the above investigations was that animals which did not react following the first injection frequently reacted after the second injection. They found that the oxidation and elimination took place at a much slower rate than in subsequent injections.

Many transfusions are followed by reactions of greater or lesser degree and this has led to a number of investigations to determine their cause. Novy and DeKruief[22] have shown that the toxicity of blood increases proportionately with the length of time since withdrawal from the veins. Hemolysis may be the cause for many reactions; but with properly grouped blood and good technique this does not occur.

Drinker[5] and his collaborators have shown in a series of experiments that there is some toxic change produced in the erythrocytes and other blood constituents by the sodium citrate. Although this might explain to some extent the reasons for more reactions with the sodium citrate method, it is not the only factor, since a large percentage of reactions occur with unmixed blood transfusions.

At the Mayo clinic[4] it is believed that some of the reactions are due to materials in new rubber tubing. Food substances, circulating in the blood, especially proteins, might be a cause of reactions. For that reason it is well to have the doner miss a meal before withdrawing the blood.

Very few reactions following transfusions are serious enough to inconvenience the patient. Deaths have been reported, but in most cases they were due to wrong grouping or carelessness in technique. The degree of severity of reactions varies a great deal, but most of them consist only of a slight rise in temperature; some have severe chills and sweating.

In several reports including large series of citrated blood transfusions, the percentages of reactions vary from 15 to 64 per cent. One author reports a series of 150 cases without a chill.

Bernheim[3] found little difference in the percentage of reactions between mixed and whole blood. In all cases he got about 22 per cent reactions of varying degrees. In a review of 280 cases at the Presbyterian Hospital in Chicago, Meleney and others [19] had 63 per cent reactions of some degree: 70 per cent by the sodium citrate method and 26 per cent by the syringe cannula method (whole blood). Lindeman[14, 15] got 33 per cent with the syringe cannula method. Hunt[8] reports 18.7 per cent chills and 1.5 per cent mild reaction, using citrated blood. McClure and Dunn found that 66 per cent of their cases developed reactions; of these 13 1-3 per cent were severe, 16 2-3 per cent slight reactions, 10 per cent chills, 22 2-3 per cent slight elevations in temperature (over 101°) 5 1-3 per cent skin eruptions and other various types of reactions.

BLOOD GROUPING

Experience has shown that most of the serious reactions following blood transfusions are due to the incompatibilities of the blood of the donor with that of the recipient. A study of these incompatibilities has resulted in the classification of all bloods into four groups, depending upon the agglutinating reaction of the serum upon the red cells.

The simplest and most reliable method of determining the group of any donor or patient is Minot's[20] modification of the Moss method. According to this method, by the use of serum from Group II and Group III, all bloods may be separated into their respective groups.

The serum from individuals of these two groups is collected and preserved in small ampules, each ampule as a rule containing sufficient serums for one test. These sera when kept in the ice box will remain potent indefinitely.

The method of performing the test is as follows: one or two drops of the patient's or donor's blood is collected in a small tube containing about a cubic centimeter of a 1 per cent solution of sodium citrate in physiological saline. This gives a suspension of the red blood cells.

Drops of Group II and Group III sera are placed on clean glass slides, and small drops of the blood suspension are mixed with each of the sera. The slides are now inclined in different planes, so as to give the corpuscles a chance to move in the serum and to come in contact with one another. If the cells are not agglutinated by the serum, they will remain separate and diffusely scattered through the drop. At most, they will not form more than short, irregular rows of cells (roulette formation); such a result is negative.

If, however, the cells become grouped into large or small closely packed clumps, agglutination has taken place, and the result is a posi-

tive one. The agglutination may occur in a few minutes, but it may be delayed 15 to 20 minutes.

Of the several groupings that have been devised for the classification of blood, the committee[10] appointed by the American Medical Association has chosen the one devised by Jansky, on the basis of priority.

The scheme of this classification is as follows:[10]

Cells	Serum			
	Group I	Group II	Group III	Group IV
Group I	—	—	—	—
Group II	+	—	+	—
Group III	+	+	—	—
Group IV	+	+	+	—

Positive (+) means agglutination.
Negative (—) means no agglutination.

Another classification, that of Moss[21] is as follows:

Serum	Agglutinates corpuscles of	Corpuscles agglutinated by the serum of
Group I	None	Groups II, III and IV
Group II	Groups I and III	Groups III and IV
Group III	Groups I and II	Groups II and IV
Group IV	Groups I, II and III	None

The percentage of incidence of these 4 groups according to the Moss classification is as follows: Group I, 5 per cent; Group II, 40 per cent; Group III, 10 per cent; Group IV, 45 per cent.

In giving transfusions, one tries to secure a donor whose blood falls in the same group as that of the recipient. However, in cases where identical groups are difficult to obtain, a donor may be used whose serum may agglutinate the recipient's red cells, but whose cells will not be agglutinated by the recipient's serum.

For this reason, Group I in the Moss classification, and Group IV in the Jansky classification, are universal recipients; and Group IV of Moss, and Group I of Jansky, are universal donors.

This is possible because it has been shown that blood from a donor whose serum agglutinates the recipient's cells, can be injected up to ¼ of the volume of the recipient's blood. According to Ruben and Ottenberg,[26] intravascular agglutination depends on three factors: (1) the concentration of the agglutinin, (2) the absorption of the agglutinin by an excess of non-agglutinable cells, and (3) the interference with agglutination by an excess of non-agglutinable cells.

There are some who believe that the donor's cells should be tested against the recipient's serum directly,[35] [11] claiming that the indirect method, i.e., grouping method, does not always show agglutination. Dr. Moses Barron in an unpublished investigation of a large series of cases found that there was no variance between the direct and indirect methods of agglutination.

INDICATIONS FOR TRANSFUSION

The indications for transfusion are many, and the list is gradually being extended. Ottenberg and Libman[24] have given the best classification of the conditions in which transfusions are of value. They are as follows:

I. Transfusions for simple hemorrhages
   1. Gastric and duodenal ulcer.
   2. Dysentery.
   3. Typhoid hemorrhage.
   4. Ectopic pregnancy.

II. Transfusions in connection with surgical operations
   1. Preliminary to operation.
   2. For post-operative hemorrhage.
   3. For shock.

III. Transfusions for the cure of hemorrhagic conditions
   1. Purpura hemorrhagica.
   2. Hemophilia.
   3. Hemorrhages secondary to
      a Blood disease.
      b Severe infections.
      c Jaundice.

IV. Transfusions for blood diseases
   1. Pernicious anemia.
   2. Leukemia.

V. Transfusion for infections.
   1. Infections with pyogenic organisms.
   2. Subacute streptococcic endocarditis.

VI. Transfusions for intoxications
   1. Acute poisoning (carbon monoxide, etc.)
   2. Diabetic coma.

VII. Transfusions for debilitated conditions
   1. Coma.
   2. Malnutrition.
   3. Simple anemia.

Disease	No. of Cases	No. of transf.	Reactions				Therapeutic Results			
			Mild.	Mod-erate	Severe	Very Severe	No Imp.	Sl. Imp.	Mod. Imp.	Marked Imp.
Pernicious Anaemia	15	56	6	2	2		2	2	6	5
Leukema	3	11					1		1	1
Secondary Anaemias	7	18	1	1	1	1		5	2	
Purpura Rheumatica	1	2						1		
Purpura Hemorrhagica	1	6		1			1			
Septicema	3	4					2	1		
Cancer	2	2	1						2	
Post Operative and Preoperative	5	5		1			2	3		
Puerperal	1	1						1		
Totals	38	105	8	5	3	1	8	13	11	6
			7.6%	4.8%	3%	.9%				
			Totai Reactions—16.3%							

Weil, and Ottenberg and Libman have clearly shown the value of citrated transfusions in hemorrhagic conditions and secondary anemias.

Its beneficial effect in pernicious anemia is attested to by the reports of large series of cases to be found in the literature.

In septic conditions the results have been disappointing. Transfusions have been used in diseases such as puerperal sepsis, septic endocarditis, and other septicemias of various kinds.

Polack[25], in a series of cases of puerperal sepsis, achieved good results in a majority of his patients by using small injections at 3 day intervals. He believes that they stimulate cellular proliferation which aids in combating the infection.

Attempts have been made to immunize an individual against a particular bacterium, and then transfuse his blood into another person infected by the same germ[16]. These results have been unsatisfactory.

Onani[23] and others have shown that in citrated blood phagocytosis is stimulated by a substance similar to atropin. In his experimental work, however, a larger percentage of sodium citrate was used than is used in human transfusions. Most of the reports on the results of transfusion of blood in septic conditions leave the impression that it is of little value.

Ashby[1] has shown that the erythrocytes of transfused blood can live and function 30-40 days. This frequently is sufficient to tide an individual over an emergency period.

Surgeons generally do not wish to operate on a patient having a hemoglobin of less than 40

per cent. One or more transfusions often bring the hemoglobin from 20 or lower up to the point where the patient is a good operative risk as far as the blood is concerned. During an operation when a large amount of blood has been lost, or where the patient is in danger of shock, transfusions are of value in restoring blood volume and raising blood pressure. Physiological saline has been used for this purpose, but it has been shown that excretion and elimination are very rapid; the beneficial effects from its use are therefore very temporary. For this reason, acacia solution, which is excreted much more slowly, has proven of greater benefit.

In carbon monoxide poisoning, venesection followed by transfusion is a generally accepted treatment. This is a means of replacing incapacitated cells by those capable of carrying oxygen.

Hemorrhagic conditions of the new born have been very successfully treated by transfusions. Of late, however, this method has been supplanted by subcutaneous injections of small quantities of whole blood, which have been found to be equally efficacious.

REPORT OF TRANSFUSIONS

We have performed a series of a little over 100 transfusions at the University Hospital during the past nine months, on 37 cases. The accompanying chart indicates the number of cases of each disease and the number of transfusions performed on each disease. It also indicates the reaction which we have classified as being mild, moderate, severe, and very severe. The mild reactions are those in which the temperature rises a degree or two, but the patient experiences no ill effects whatever.

Under moderate reactions we classed those with a rise of temperature and chilliness, the patient feeling only slightly uncomfortable.

Under moderate reactions we classed those tients who developed chills and who felt definitely uncomfortable. The one reaction recorded under the very severe group was in a case where blood of the donor was incompatible with that of the recipient.

ILLUSTRATIVE CASES:

A few cases have been selected to illustrate the therapeutic effect of transfusion in the various diseases; these cases will be described in some detail.

Case I. Mr. S. H., Hosp. No. 20388, entered the hospital in a very stuperous condition, extremely weak and vomiting. He could hardly talk because of weakness, and would fall asleep while being questioned. He had difficulty with urination. At first he had to be catheterized; later he had involuntaries.

The history of his present complaint dates back for a period of five years, when he first noticed that he was getting pale, and that he developed frequent attacks of glossitis. Later, he developed eruptions in his mouth and severe nose bleeds. Still later, his skin became yellow and he experienced attacks of severe pain in the region of his liver.

He was very weak for about a year, and then had a remission which lasted for six months. Following this he had a gradual recurrence of symptoms until he entered the hospital.

A physical examination at that time showed a male, age 30, very stuperous, pale, and somewhat yellowish. The liver was enlarged and tender, spleen not palpable. There was a marked edema of the inferior extremities.

The blood on entrance showed a hemoglobin of 10—12 per cent; erythrocytes 500,000; leukocytes, 5,000. The blood smear showed a marked anisocytosis with a large number of megalocytes and microcytes. There were no nucleated red cells. He was given two transfusions at four day interval of 250 cc. of citrated blood. In 13 days his hemoglobin was 20 per cent, erythrocytes 1,500,000. A week later he was given another 300 cc. injection, which was followed by a rise in hemoglobin to 39 per cent, with 2,400,000 red cells.

Before leaving the hospital he was up and about the greater part of the time, and except for pain in the hepatic region he stated that he was very much improved in strength and subjective sensations.

Case II. Male, age 33, Hosp. No. 20734, by occupation a glass blower. He came into the hospital complaining of numbness and sandy feeling in his fingers and toes. He noticed these first symptoms about three months before entering, at which time he bled a great deal from hemorrhoids.

He was very weak; his gait unsteady and staggering; and he had a great deal of edema around the ankles.

On entrance his blood examination showed a hemoglobin of 16 per cent, with 936,000 red cells and 4,400 leucocytes. He received three transfusions of 350 cc of citrated blood, and one of 450 cc of blood. At the end of two and a half months his hemoglobin was 64 per cent, erythrocytes 3,100,000. There was no sign of new blood formation in the smear. He got along very well for five months, when his symptoms again reappeared.

Case III. This was a very interesting case of chronic myelogenous leukemia, Hosp. No. 19065, female 26 years old. Her present illness began in July 1916. The onset was marked by anemia, headache, and jaundice.

In November 1916, she began to have cramps in the

left flank. In March 1917, she had a splenectomy at the Mayo Clinic, preceded by radium treatment.

She felt very well up to January 1919, when she developed pallor and loss of appetite. She returned to the Mayo Clinic where she was given radium treatment again with good results.

In September 1919, she vomited a great deal of blood and entered the hospital in a comatose condition.

Her blood examination on entrance showed a hemoglobin of 15 per cent, red cells 1,650,000, leucocytes 364,000. A large number of myelocytes and nucleated red cells were present in the blood smear. She was transfused with citrated blood five times, and left with a hemoglobin of 56, red blood cells 3,800,000, leucocytes 62,000, with a marked decrease in the number of early white cells.

She returned March 3, 1920, having felt well up to three weeks before entrance. Her throat was sore, neck stiff, and she had been expectorating a little blood. She had gained fifteen pounds since her discharge.

Her blood examination on her second entrance showed 53 per cent hemoglobin, 1,800,000 red cells, 130,000 leucocytes. The smear showed a large number of myelocytes and premyelocytes, also nucleated red cells.

Her third entrance was June 21, 1920, having been well up to three weeks before that time. Her hemoglobin was 14 per cent, red blood cells 1,920,000 leucocytes 320,000, myelocytes and premyelocytes 64 per cent. She was transfused three times and on her discharge her blood showed 44 per cent hemoglobin, 3,000,000 erythrocytes, 72,000 leuococytes, with 16 per cent myelocytes.

Her fourth entrance to the hospital was August 16, 1920, on account of severe epistaxis. Her blood examination at that time showed 18 per cent hemoglobin, 1,900,000 erythrocytes, 350,000 leucocytes, of which 48 per cent were myelocytes. She received two transfusions of 500 c.c. each, and on discharge her hemoglobin was 34 per cent, 2,400,000 red blood cells, 147,000 leucocytes.

She went home, and two months later she had a very severe attack of small pox. On visiting the hospital one month after her recovery from small pox, her blood picture showed a hemoglobin of 35 per cent, 3,000,000 erythrocytes, and 280,000 leucocytes, with a large percentage of myelocytes.

It was interesting to observe how very little blood change resulted from the attack of small pox. She died at her home on March 1, 1921. The immediate cause of her death was unknown.

Case IV. Another case of leukemia, of a woman age 59, Hosp. No. 19761. This was of the chronic lymphatic type. Although her disease was chronic, her blood picture was that of an acute leukemia—the large lymphocytes predominating. She was sent to the hospital for an operation on account of an abdominal tumor, which proved to be a large spleen.

Her blood count on entrance showed a 55 per cent hemoglobin, 4,000,000 erythrocytes, 63,000 leukocytes, of which 73 per cent were lymphocytes. She was given 450 c.c. of citrated blood, and coincidentally an x-ray treatment was given to the spleen.

In less than three weeks her white count went down to 8,000, with 51 per cent lymphocytes, the large lymphocytes still predominating. Four months later her leucocyte count was still normal, but unfortunately the differential count continued to show an abnormally high percentage of lymphocytes. It is difficult to say which treatment, i. e., x-ray or transfusion, had the greater effect in reducing the leucocyte count.

Case V. Hosp. No. 20184, female, 20 years old. This patient entered with a diagnosis of purpura hemorrhagica on November 11, 1920. She complained of weakness, vomiting, and an eruption over her body. By occupation she was a clerk. There was no history of purpura or hemophilia in the family. As a child, she had meningitis, pleurisy, and frequent tonsillitis.

In July 1919, she noticed a few red spots on her ankle. In August she had nausea, vomiting, and pain in her lower right abdomen. She was taken to the hospital for an appendectomy, where her purpuric condition was discovered.

She was transfused, and improved somewhat for a short time. Later, she was again taken to the hospital for a tonsillectomy, at which time she received another transfusion.

Physical examination on entrance showed many brown macules over her feet and legs. The mucous membranes were all very pale. Her blood count showed a hemoglobin of 50 per cent; erythrocytes 4,000,000, leucocytes 8,000, platelets 176,000; bleeding and coagulation time were normal. There was considerable blood present in the urine, but none was found in the stools.

These findings clearly indicated that her condition was one which belonged in the purpura rheumatica group, and not in the hemorrhagic group. All told, she received four transfusions; two before entrance, and two at our hospital, with no improvement. This result is exactly what is to be expected in this type of purpura.

TECHNIQUE USED

The amount of sodium citrate used varies from a 0.2 per cent to 0.5 per cent solution. In our work, we started using 15 c.c. of a 1.5 per cent solution for each 100 c.c. of blood to be transfused. This makes a .22 per cent solution. At this time we were using a syringe cannula system, and had some difficulty with the syringe binding. We then increased the amount of sodium citrate solution up to 20 c.c. giving us a 0.3 per cent solution, which we have used with great satisfaction.

On account of the many disadvantages in the

various types of apparatus which are used in citrated blood transfusions, we have devised an apparatus which obviates many of the objections. We have described this apparatus in detail in a previous article[7].

In our hands, it has demonstrated itself to be an extremely efficient apparatus on account of its ease of manipulation, cleanliness, safety, and compactness.

The necessity of maintaining operating room asepsis after the apparatus is sterilized, applies only to the handling of the needle, and the preparation of a small area of the arm where the needle is to be inserted, as the entire apparatus is closed. Transfusions can be done at the bed-side, in the home, without fear of septic complications.

THE DONOR

In addition to the suggestions made in our previous article regarding the selection of a donor, it is of value to know that the effect on the donor after giving a pint of blood, or more, is negligible. There may be a slight feeling of lassitude for the remainder of the day, but he will be entirely free of any effects the following day. Occasionally, nausea and vomiting follow the removal of large amounts of blood.

Individuals with a tendency toward tuberculosis should not offer themselves as donors. An instance was related to us by one of the hospital staff, where a nurse, after donating blood, developed actively progressing pulmonary tuberculosis and died.

DISCUSSION

The three main functions of transfused blood may be stated as follows: (1) to stimulate the bone marrow to produce new cells; (2) to furnish new cells which are capable of functioning, i. e., the erythrocytes of the donor; and (3) to provide bulk and sustain the blood volume.

In transfusions for simple hemorrhages the results are generally very good; for, in addition to the above functons, it helps to stop the bleeding by aiding coagulation; in many cases the hemorrhage stops promptly following transfusion. It has been found to be especially efficacious in duodenal ulcer hemorrhage where there is a constant oozing of blood.

The same results obtain in typhoid hemorrhages; and Ottenberg and Libman[24] state that in all cases of typhoid where blood has appeared in the stools preparation should be made to do a transfusion if necessary. We had just recently a case of para-typhoid fever where the severe intestinal hemorrhage ceased after three transfusions. The citrate in the blood may be a factor in stopping the bleeding, as was shown by Weil.

In most cases of bleeding in hemophilia and purpura hemorrhagica where the cause is a deficiency of certain blood constituents, transfusions of blood act as a specific; and its early use has been the saver of many lives.

The hemorrhages which occur in purpura rheumatica, however, are not affected by transfusions, as the bleeding in these cases is not due to a deficiency of the necessary elements which bring about coagulation.

In blood diseases such as pernicious anemia and the leukemias transfusions often have a very striking effect, and may be the means of prolonging the patient's life for several years. It is with these cases that we have had most of our experience. In the series of twelve cases of pernicious anemia we have had good results, though temporary, in all but one.

Case No. I, who was practically in extrimis on entrance, undoubtedly owes his remission to the transfusions which he received soon after admission. This case very likely would have died had he not been promptly transfused.

Case No. III, chronic mylogenous leukemia, had her life lengthened by several years as the result of transfusion; and it is altogether possible that her life could have been still further prolonged had they been continued after she left the hospital. The girl received remarkable symptomatic relief the day following her transfusions. Her pain over the liver, the headache and lassitude, would leave. This sense of comfort and well-being following transfusions in pernicious anemias and leukemias is rather common.

Although one frequently sees increases in hemoglobin of 50 to 60 per cent following transfusions in pernicious anemia, it is very difficuult in most cases to find signs of new cell formation, i. e., nucleated cells, reticulated cells, etc. One of our cases on entrance showed large numbers of megaloblasts and reticulated cells, but had very little improvement following two transfusions. It is problematical as to whether or not

the bone marrow really is stimulated to produce new cells. If we should gauge the stimulation of bone marrow by the number of erythroblasts circulating in the blood stream, then the bone marrow response following transfusions is not very great.

In many cases the rise in percentage of hemoglobin and the increase in the number of red cells continue for a period as long as six months following transfusions. However, it must not be overlooked that remissions occur in cases which have not been transfused; and that the exact proportion of the remissions initiated by the transfusions can not be determined.

In only 16.4 per cent of our cases did reactions occur. Of these, only one reaction could be called at all severe; and in this case 10 to 15 c.c. of blood was injected from a donor whose blood group, on being rechecked, was found to be incompatable with that of the recipient. Immediately after injection the patient became very restless, his face flushed and cyanotic. He complained of a severe sense of constriction across his chest. The pulse and respiration became very rapid, and he broke out in a profuse sweat. About fifteen minutes later he developed a severe chill which lasted 15 to 20 minutes. The next day he showed hemoglobin-uria and an intense jaundice. This is a typcal picture of a reaction as a result of wrong grouping. In this case we gave Group II blood to a Group III patient. This error has resulted in death in some cases, according to reports from the literature, although usually the patient recovers, as fortunately did this one.

The hemolysis in the case just cited was due, not to the agglutinins present, but as has been pointed out by many investigators, to a homolysin which is frequently present in the same serum along with the agglutinin.

Another of our cases developed an uriticarial rash all over his body, after two of his transfusions, although the blood was from different donors. The first time the rash appeared one hour after completion of transfusion, and disappeared four hours later. The second time it appeared during the transfusion, and lasted about 45 minutes.

Several of our cases showed no reaction other than a rise in temperature of from one to two degrees, lasting for several hours, and appearing not before 11 to 24 hours after the transfusion.

The reactions following transfusions, as Novy and DeKruif have shown, are of the foreign protein type. The sodium citrate per se, therefore, can not be held responsible for the reactions since even toxic doses of this salt produce entirely different types of symptoms, such as convulsions, spasms, and nervous disturbances.

It is very rare that more than 900 c.c. of citrated blood is transfused. This amount contains 2.7 grams of the sodium citrate, which is much below the toxic dose. In our transfusions we average 1 to 1.5 grams of the salt, which is equivalent to about 30 to 40 milligrams per kilo of body weight, or one-half the toxic dose for cats.

Our percentage of reactions appears to be lower than those reported in the literature; and the reactions themselves on the whole, appear to be of the milder type. The reason for this we do not know; undoubtedly every worker uses the same precautions as we do: chemically pure sodium citrate, freshly distilled water, and careful blood groupings. Our apparatus has a minimum amount of rubber tubing, which may eliminate the tubing as a factor. In over 90 per cent of our cases we made no attempt to prevent reactions by administering morphine, adrenalin, hot drinks, or other remedies which are frequently used.

SUMMARY

Blood transfusions may be considered one of our very useful and very important therapeutic measures, and when properly used may be a means of prolonging and even saving life. It frequently gives considerable symptomatic relief, and this may add greatly to the comfort of the patient.

2. Although it is a procedure not requiring a great deal of skill, one must always use every precaution to avoid accidents and thus preclude any untoward results.

3. From the reports in the literature, and from our own experience blood transfusions are certainly no more dangerous and are followed by no greater discomfort than the injections of neosalvarsan.

4. Though deleterious results and even several deaths have been reported to have followed transfusions, these generally were attributable

to faulty judgment in the selection of cases, or to gross errors in the technique.

5. Our experience with citrated blood transfusions has been both gratifying and encouraging. We feel that the usefulness of this procedure is gradually enlarging with the increase in the simplicity of the technique.

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THE TREATMENT OF TUBERCULOSIS OF THE SPINE*

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Since the advent of active surgical treatment for tuberculosis of the spine about ten years ago, the literature has been full of reports and articles advocating some one of the several operative procedures used, especially the Albee and Hibbs operations; but very few have laid any stress on the benefits still to be derived from the older classical measures of the more conservative treatment. Although believing that both forms of treatment have their distinctive places in the handling of these cases, it has long seemed apparent to the author that the operative treatment has unjustly and unreasonably overshadowed the conservative and it is with the hope of establishing, in some slight measure at least, a better balance that this paper is written.

Like many new forms of treatment, especially if they consist of somewhat spectacular operations like the transplantation of a piece of tibia into the spine, the operative measures were rapidly accepted by a large number of surgeons, orthopedic and otherwise; and consequently many men who never would have thought of handling a case of spinal tuberculosis before, now tell how many cases they have operated upon. A knowledge of the underlying pathology was frequently lacking and the principles underlying all treatment were absolutely forgotten in the enthusiasm for operation; while the apparent fact that operative measures were not cures but merely new ways of applying the old principles was ignored. Many cases have been grossly neglected because of the faith of the ignorant in the operation alone. The universal application, then, of operative treatment must be condemned and the absolute necessity of the use of conservative measures in post-operative treatment strongly emphasized.

There is no diseased process occurring in the human body where the pathology more clearly indicates the principles of treatment as does tuberculosis of the spine. This pathology is too well known to need any description here and we need only recall that the weight bearing part of the spinal column is involved and that without treatment this part caves in, the motion taking place at the interneural joints. and the typical kyphotic deformity or "hunch back" results.

The principles which underlie all local treatment are very evident. There must be removal of weight bearing and prevention of flexion of the spine; there must be fixation, which need not always be absolute (as will be seen later); and lastly any deformity or caving in which has already occurred must be prevented from increasing and, if possible, corrected. This latter point, the correction of the deformity, is frequently overlooked but unfortunately must be applied in the majority of cases, for examination of case-histories shows that about the most common symptom for which children are brought to the clinics for treatment is "lump in the back."

The principles of the general treatment and their application must not be overlooked, as they play a very important part in raising the resistance of the body to the point where the tuberculous infection can be overthrown and destroyed. Cure, as with any other tuberculous infection, can only take place in this way and local measures are only contributory factors. Chief of the general measures, aside from the usual fresh air, dietary and hygienic regime used in all tuberculous cases, is heliotherapy and no discussion of the treatment of tuberculous spondylitis would be complete without a short elucidation of this procedure. The principle is to build up the fighting powers of the body by carefully graduated exposures, so as to prevent burning, to the direct, unfiltered rays of the sun. The active rays are in the ultra-violet part of the spectum and usually cause deep pigmentation of the skin. Apparently the resistance to the infection is in direct relation to this pigmentation for a patient who reacts quickly to the exposure and tans and pigments heavily can be given a much better and shorter prognosis than one who does not react so strongly. One frequently sees, for

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example, cases with multiple discharging sinuses whose resistance is very low and where it seems impossible to get more than a very faint degree of pigmentation, even after many months, until suddenly the condition changes for the better and deep tanning then occurs.

In a climate such as we have in Minnesota it is impossible to use heliotherapy for more than a few months in the summer although with proper arrangements it can be prolonged much more than would at first seem possible. The direct rays of the sun are very warm even in winter and if a patient can be protected from the wind, exposure of the body is possible even when the temperature is fairly low. Of course, except during the very warm weather, there must be absolutely no exposure except in the direct rays of the sun. The artificial-sunlight or quartz lamp can be used as a very satisfactory substitute for sunlight in bad weather or when the temperature is low. Care must be taken not to burn the patient, however, as the rays are very powerful, but any intelligent attendant can soon learn to apply it proficiently.

Other general measures in use besides the heliotherapy are, tuberculin therapy, the roentgen ray, and numerous forms of special lights devised to act as local sterilizing agents and in the same manner as sunlight. Of these measures the use of the roentgen ray seems to be the only one of established value and there is no doubt that the more universal use of this therapeutic agent would hasten the recovery of many cases who have been suffering for months or years from discharging sinuses.

The local treatment, the principles of which have been already mentioned, must not be ignored while applying the above general measures but must be rigidly applied from the first. This treatment varies with different cases and should be more radical in adults than in children. Children can be cured by conservative measures and the function of the spine in many of these cases not permanently interferred with. That is, there is a complete and absolute cure. This is not the case with adults where there is always a definite decrease in the function of the spine with ankylosis between a certain number of the vertebrae even in the cured cases.

What then is the treatment recommended for tuberculosis of the spine in children? Very emphatically not operative, but, with few exceptions, strictly conservative. If we remember the general principles, the particular type of apparatus to be used in this treatment can be chosen from a long list of very efficient methods all of which are very satisfactory if properly used. As with any other established method in surgery the wrong application or adjustment reacts not against the method but against the surgeon applying it and if a case does badly with a classical type of treatment it is necessary to investigate how that treatment is being applied.

There are certain methods which have been found to be most satisfactory and these it is desired to describe more in detail but with the understanding that all the other methods are not condemned thereby. In the first place all acute and subacute cases should be treated in absolute recumbancy, preferably on a gas-pipe frame. This frame is made of galvanized gas-pipe and should be from four to six inches longer than the patient and just the width of the shoulder joints or about four-fifths the width of the body. The importance of this last measurement is frequently overlooked and the result is a wide frame upon which it is impossible to keep the patient properly. The shoulders should overhang the side bars of the frame. The bare frame is covered with a heavy canvas which is drawn tight by means of a lacing on the reverse side and the area of the deformity is protected from undue pressure by sewing two felt strips onto the canvas in such a manner that the spinous processes will rest between them. A piece of rubber sheeting is placed over the center of the frame to protect the canvas from soiling and the whole can then be covered by a small sheet. The child is placed on its back on the frame and is held in that position by one or more aprons or retaining straps which fasten around the frame and the body. Frequently in order to be sure that the patient does not lift himself from the frame a special apron with arm-holes is used over the upper part of the body.

After the child has become accustomed to the new condition, and it is surprising how

quickly most children accommodate themselves to this fixation, the frame is bent backward so as to apply a hyper-extending force to the spine in addition to that of gravity and gradually in this way, if the apex of the bend is at the point of deformity, the kyphosis will flatten out. The diseased and crushed bodies will separate and eventually a reversal of the deformity may be obtained, the spine assuming the position of a long-rounded lordosis. Cases with very acute and severe symptoms or those with paraplegia, especially if the disease is situated high up in the spinal column, will frequently need additional treatement for a time consisting of direct head traction by means of the weight and pulley. Counter fixation must of course be used to prevent the patient from being pulled off of the frame.

With the application of a properly fitted and prepared frame the symptoms of spinal disease subside almost immediately and a pitiful, suffering child will in a very few days be bright and cheerful.

The routine care of patients undergoing the above treatment is very important and nurses and parents must be carefully instructed in their management. Daily, without fail, the child must be taken from the frame and the back cleaned and rubbed with alcohol. In order to prevent any flexion of the spine the child is removed by turning the frame over so that he is lying on his abdomen on the bed, the aprons or retaining straps having first been loosened. If possible, another frame should be in readiness so that the old frame need not immediately be cleaned up. This is of especial value in an institution as much time can be saved by this method.

As the cure progresses the child can be allowed to spend several hours a day lying on its abdomen, there being no attempt made to keep the spine absolutely rigid, flexion only being prevented. A gas-pipe frame with the curve reversed has been found of value here and it can readily be seen that the prone position on such an apparatus is very ideal. Further hyperextention of the spine can take place and by raising on his elbows the patient can augment the forces tending to decrease the deformity. This far from being injurious, has apparently been of great value in many cases.

After from six to eighteen months, depending on the duration and severity of the case and the number of vertebrae involved, it is time to very gradually commence ambulatory treatment. Here again as with the recumbant treatment, there are many types of apparatus to be used, probably the most efficient being a plaster of Paris jacket of the Calot type, that is, a jacket which, even with low lumbar disease extends over the shoulders and around the neck. With disease higher up the chin and occiput or even the entire head must be included in the plaster. These jackets may be used from the very beginning of the treatment in place of the gas-pipe frame if desired and with a very large pear-shaped window cut out over the chest and abdomen anteriorly and a small rectangular window over the deformity posteriorly, this deformity can be markedly helped. This is accomplished by forcing into the posterior window a large pad of sheet-wadding and holding it firm by means of a bandage. The pad is removed and increased in thickness as needed. If the deformity has been cured or further correction is impossible the smaller window is not cut, but the anterior opening must be provided in all cases.

A brace of the general type of the Taylor brace can be used if desired for this convalescent treatment instead of the plaster packets, but the main objections to it are the constant adjustments which must be made and which can only be carried out properly in the majority of cases in a hospital. If the patient is to be at home the advantages of a jacket are obvious.

Ambulatory treatment must be started very gradually, several weeks being allowed to elapse from the time the first deviation from the recumbent position is permitted until the patient is finally walking around. The muscles are very weak and the vital organs are unused to the vertical position so it is only by proceeding step by step that the child is finally entirely freed from the effects of the long recumbency.

There now must elapse another long period before cure can be realized. The minimum total time for active treatment must be about

three years, unless the case was an old one before coming under observation, and thus this ambulatory treatment must last for many months. The jacket must be changed at intervals and toward the end may be replaced by a removable jacket or back brace. When cure is apparently complete the brace or apparatus being worn can be removed at night and used only during the day and then later it is also gradually removed for increasing lengths of time during the day. Cure can only be finally ascertained by a long trial period without support, substantiated by the radiographic evidence.

Occasionally one may find a case of tuberculosis of the spine in childhood which, on account of some particular circumstances, such as inability to control and obtain proper fixation by conservative means due to lack of cooperation by the patient or its parents, may call for operative treatment. The question of the type of operation then arises. It must be repeated that no new principle is followed in using operative measures but that these measures aim either to splint the spine internally, as by the bone graft method or Albee, or to cause a fusion of the spinal arches and processes as by the method of Hibbs. The concensus of opinion seems to favor the insertion of a graft into the split spinous processes rather than the more difficult and less immediately satisfactory fusion operation. Calve's new method of placing a short graft between the spinous processes of the diseased vertebrae only, would appear to be theoretically correct as it has for its object the blocking of the lesion without interfering with any correction of the deformity which the conservative measures may obtain. The operation is too new to have been thoroughly tried out however.

If an operation is performed it must be followed by active conservative treatment and at no time must this be forgotten. None of the operative measures are sufficient in themselves, although much has been claimed in this regard, and the bad results one is constantly seeing in the clinics following the radical measures are due largely to a blind faith, both on the part of the surgeon and the family, in a small graft of bone which has been incapable alone of resisting the action of the body weight.

The question of treatment in adult tuberculosis of the spine now remains, and here operative measures for all cases is recommended with certain definite restrictions. As complete spinal function never returns in an adult the operative fixation can do good only; if undertaken too soon, however, a certain amount of correction of the deformity is prevented and the result, although usually satisfactory so far as the disease itself is concerned, not so excellent as it might otherwise have been. Conservative measures are strongly indicated therefore, until such correction of the kyphosis as seems possible is obtained and then the radical therapy can be instituted. Here again the postoperative treatment must be emphasized and a rigid and prolonged application of conservative methods insisted upon. The time which must pass before cure takes place is probably much longer than with children and the late after treatment must not be hurried.

In spite of the best of treatment some cases of spinal tuberculosis will not react properly and will finally die of one of the graver complications. There are many deaths however which are preventable, and the larger part of these are resultant on the mixed infection which follows the improper treatment of tuberculosis abscesses. These abscesses are therefore a most important complication and their handling should be thoroughly understood. The great danger being mixed infection, no abscess should be opened unless causing trouble by its presence Size is no criterion and it is only when there is pain due to its presence or a possibility of spontaneous rupture that interference is indicated. Many abscesses will disappear spontaneously and need no direct attention but if evacuation becomes necessary aspiration should always be used, open incision being absolutely contraindicated. By aspiration mixed infection is prevented, for the track of the needle heals by first intention and the chronic discharging sinus is thus obviated.

The only other complication of importance from a therapeutic standpoint is paraplegia and nothing but conservative handling is ever indicated here. A small number of cases is due

to actual destruction of the cord and of course laminectomy can be of no avail; but in by far the greater number the lesion is only temporary and will clear up as the disease itself subsides. Operative decompression is not indicated at any time.

Tuberculosis of the spine is therefore a disease of which the therapy, both of itself and its complications, is decidedly conservative. Operative measures are certainly indicated at times but never can the fundamental principles of treatment be replaced by radical measures.

To sum up;

1. The treatment of tuberculosis of the spine in children should be routinely conservative, operative therapy being only occasionally indicated.

2. The treatment in adults should be more radical.

3. Operative measures are merely complimentary to and do not replace the older classical methods of theatment, the underlying principles remaining always the same.

4. The actual tuberculosis infection remains for many months or years in the vertebrae and it is probable that the operative fixation of the spine does not hasten its elimination more than the proper conservative methods.

DISCUSSION

DR. J. R. KUTH, Duluth: The doctor has very completely reviewed the subject under discussion and has properly expressed a conservative position in the treatment of these cases. The one essential factor in the treatment of cases of tuberculosis of the spine is time. It is best to think not in terms of months but rather in terms of years. It is for this reason that these patients ought to be kept under observation for a long time and their life and later activities regulated and governed by the best possible conditions. We know that a tuberculous infection may remain latent for years and may recrudesce at any period.

Regarding the correction of deformity, the doctor has very properly urged caution. We know that bone destroyed by tuberculosis is seldom or rarely replaced and deformity inevitably results. It is therefore best to accept deformity, and it is quite probable that any improvement of the deformity brought about by treatment is rather accomplished at the expense of the section of the spine above and below the lesion. A warning should be sounded against the forcible correction of these deformities. Recovery with movement in a tuberculous joint in general probably is a rare occurrence. Heliotherapy probably gives the best chance to obtain such a recovery.

It is a debatable question I believe whether it is advisable to strive for movable joints as a rule. Personally, if I had a tuberculous knee or tuberculous hip or a tuberculous spine, I would feel much safer with that segment or joint firmly ankylosed. I believe it is much more certain to add to the permanency of the cure.

Towards the latter part of the paper the doctor accentuated the importance of not draining tuberculous accumulations of pus. That is a warning that has been sounded repeatedly in the literature, but it is not at all uncommon to see cases with large incision made into these pus accumulation. In many cases the size and number of incisions is regulated by the size of the former accumulation. This is a distinct disadvantage. While we frequently see it, it lessens the chances of the patient so far as recovery is concerned.

Some years ago I had a slight experience with the x-ray treatment of tuberculous joints. It is possible that those cases which are synovial in type may be benefited somewhat by x-ray treatment, but it is difficult I believe to obtain much improvement in the osseous type which are of course by far the most frequent.

The sunlight treatment is probably one of our best, as well as our latest, methods. We are using it, and I believe it can be used in colder climates by beginning in early spring and continuing until late in the fall. I have seen more marked local improvement in surgical tuberculosis from this one aid than from any other.

DR. EMIL S. GEIST, Minneapolis: I want to compliment Dr. Cole on his lucid, brief and modern display of the most recent treatment of tuberculosis of the spine. I consider tuberculosis of the spine in the adult quite different from that in the child. We all know that in the adult the surgical treatment is the treatment par excellence. In my own work it has been a long time since I operated on a child, that is, a child under sixteen or eighteen years of age, for tuberculosis of the spine.

The diagnosis of tuberculosis of the spine in the child is different than in the adult. As a rule, in the child the diagnosis is easy and very difficult in the adult. An article was published by Cabot some years ago on the diagnoses made in cases at the Massachusetts General Hospital, which were checked up by postmortem examinations later. Among a large number of diseases missed by the diagnosticians, the second in order was tuberculosis of the adult spine. I believe I have more cases of tuberculosis of the spine to deal with in adults than in children. The condition is not infrequent.

Operation, in children, as I said before, is almost entirely to be ruled out. The graft is absent after a year: absorbed. So far as adults are concerned, the

operation is to be advised if the patients are good operative risks. The American Orthopedic Association Commission collected a large number of operated cases, and reported them a month or two ago in Boston. The general trend of the report was in favor of operative procedures in properly selected cases in adults.

DR. M. S. HENDERSON, Rochester: I wish also to compliment Dr. Cole on his comprehensive discussion of this subject. I cannot add very much to what he has said, but I would like to emphasize one or two points.

There is a big difference between tuberculosis of the spine in children and in adults, and I think we all agree with Dr. Cole that conservative measures are the ones to follow out in children. There are many reports of operative work in recent years, and I think we can interpret them as not being very good in children. In adults my impression is that the results are better than by the conservative methods.

I did not hear Dr. Cole mention tuberculosis of the spine following the acute diseases, and I would like to ask whether in his experience he has noticed tuberculosis of the spine in children following the influenza. We have seen quite a number of cases in adults.

I might add to the discussion a report of a study I made last winter. At that time I reviewed all of our cases operated on in the last nine years by the Taylor-Hibbs method. The paper has not yet been published. We found we had some 160 odd cases and these cases had all been operated on for a year or eighteen months before I made my review of the work. There were 50 per cent of cures, the patients being able to go back to work and take their places in civil life. Ten per cent died later from disseminated tuberculosis, some of meningitis, some of miliary tuberculosis, and some of generalized tuberculosis. Only ten or eleven children were operated on, and the majority of these cases were failures. Judging from these results we feel that we should continue to operate on adults but not operate on children.

DR. L. E. DOOLITTLE, Duluth: There is only one point I would like to mention in Dr. Cole's paper, and that is in regard to braces. Dr. Cole said it was hard to keep the back fixed with braces and that a plaster jacket was the best way to carry out the preliminary treatment. There is a brace that has been used quite a bit which I have not seen anywhere around here. It seems to me so much better than the old type of Taylor brace that I would like to draw it for you on the board and to give you an idea of what can be done with this particular type of brace.

The old Taylor brace had a single bar around the pelvis with two bands at the back. You get fixation and hyperextension. The Taylor brace slipped up and down on the pelvis. This other brace starts like this (illustrating) with two bars opposite the spine, with a band around this way (indicating), and another bar which encircles the crest of the ilium around the anterior superior spine and fastens to this bar in here, and then there is a bar up here (indicating). There are straps which go up around the shoulder to produce hyperextension. This particular type of brace fits snugly over the crest of the ilium and you have absolute fixation. The brace fits over the pelvis and you can get any degree of hyperextension you wish. It is the most efficient type of brace I have ever seen.

Dr. Bennett, of Baltimore, is responsible for this particular combination. It is a combination and has no particular name so far as I know.

DR. WALLACE H. COLE, St. Paul (closing): I have very little more to add to what I have already said. Answering Dr. Henderson, we have seen cases in children following influenza. I have seen half a dozen cases in ex-soldiers who had influenza in the army and had painful backs develop into definite tuberculosis of the spine. I recall one case the history of which may be interesting to you. A soldier, who developed symptoms of tuberculosis of the spine, was sent to the hospital and developed paraplegia within a day or two, and although a long graft was put into the spine with complete fixation, and he was absolutely immobilized for nine months, he developed an acute miliary tuberculosis with meningeal symptoms and died. Autopsy showed the graft was absolutely solid. In spite of absolute fixation he developed an acute miliary tuberculosis. With the best of fixation we do not always get a cure.

THE TREATMENT OF PERICARDITIS WITH EFFUSION*

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Percarditis is an inflammation of the serous layer of the pericardium. The inflammatory process, however, often extends outward through the whole thickness of the pericardium, involving adjacent structures, and inward into the musculature of the heart.

Inflammatory exudation presupposes infection which, with rare exceptions, is probably always present. A hemorrhagic effusion may be due to malignant disease. Pericarditis has been observed following the injection of diphtheria antitoxin (Cunnington), and recently a case of hemorrhagic pericardial effusion following arsphenamin injection, but probably due to malignancy, has been observed in the Mayo Clinic. Wacher, Vergely, and others have reported cases of syphilitic pericarditis.

The older writers recognized primary idiopathic pericarditis following chill or trauma, a condition analogous to the so-called primary idiopathic pleuritis with effusion. It is now quite generally accepted, however, that in the great majority of instances this type of pleurisy is tuberculous. McPhedran believes that a considerable proportion of cases of plastic pericarditis are tuberculous. It seems probable that also many of the cases of pericarditis with effusion are tuberculous.

The occurrence of a tuberculous pericarditis when there is no tuberculous focus elsewhere, pulmonary, pleural, or glandular, has been questioned, and by some writers categorically denied. To vouch for the occurrence of such a primary lesion, however, is no less an authority than Virchow, who describes a case in detail in which careful search at necropsy failed to demonstrate any lesion whatsoever outside the pericardium. Similar cases have been reported by Thym, Meltzer, Scagliosi, Jahn, and Fromberg.

The most frequent cause of primary pericarditis is probably the infective organism of acute articular rheumatism, which in such cases attacks the serous layer of the pericardium rather than that of a joint. Cases have been observed in which a friction rub was the first sign of an acute articular polyarthritis.

Pericarditis is usually secondary to a disease process elsewhere. Acute articular rheumatism is the most frequent primary disease entity. Pleurisy, pneumonia, the acute general infections, tuberculosis, and syphilis represent the less frequent associated disease conditions. In a series of 100 cases at the Boston City Hospital during fourteen years Sears found the pericarditis associated with acute rheumatism in fifty-one, with pneumonia and pneumococcus infection elsewhere in eighteen, chronic nephritis in seven, pleurisy in five, gonorrhea in two, chronic rheumatism in two, and in one case each with empyema, tonsillar abscess, acute nephritis, hepatic cirrhosis, and chronic fibrous pneumonia. Nine cases were classified as idiopathic.

In young children and infants suppurative pericarditis seems to be largely a complication of pleurisy and pneumonia. Of 100 cases reported by Poynton sixty occurred in association with empyema and forty with pneumonia.

Clinically pericarditis with effusion is usually classified as serous, hemorrhagic, or purulent, or as combinations of these types of exudates. In Sears' series "fifty-four were dry, forty-one serous, four hemorrhagic, and five purulent." Of 100 cases that have come to necropsy at the Mayo Clinic since 1910, twenty-three were acute fibrous, twenty adhesive or obliterative, twenty-seven serous, twenty-one purulent, and four hemorrhagic. This classification, however, has no etiologic basis. In rheumatism the exudate is usually serous, but may be hemorrhagic or purulent. The effusion is most liable to be purulent in association with suppurative pulmonary and pleural processes, especially those due to the epidemic type of streptococcus infection. McPhedran states that a purulent effusion is usually such from the onset. Hemorrhagic effusions are especially frequent in association with purpura, scorbutus, and malignant disease, but also with tuberculosis, nephritis, and the cachectic states.

DIAGNOSIS

Diagnosis is of prime importance in any con-

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sideration of pericarditis. McPhedran states that no acute disease is so frequently overlooked. An adequate discussion of the diagnosis is beyond the scope of this paper. In general it may be said that diagnosis of the presence of a pericardial effusion is based on finding a pericardial friction rub, which may or may not disappear, increased precardiac dullness, and enlarged heart shadow on roentgen-ray examination, feeble or absent heart sounds, absent apex impulse, small rapid pulse, dyspnea, and cyanosis Occasional signs are dysphagia, precardiac pain, pulsus paradoxus, and recurrent nerve paralysis. Downward displacement of the liver and dullness in the left side of the back may also be found. The differential diagnosis is essentially between pericarditis with effusion and cardiac dilatation.

SURGICAL TREATMENT

The principles of the surgical treatment have been developed through the cumulative experience of many surgeons. No large series of original cases has been reported. The relatively small individual surgical experience is pointed out by Kolb. He states that at the Heidelberg Clinc from 1897 to 1911 30,050 operations were performed. Among these were one pericardiocentesis, four pericardiotomies, and four cases of cardiolysis. Whittemore writes that the records of the Massachusetts General Hospital contain the histories of only two operations for purulent pericarditis.

From the standpoint of surgical treatment the important consideration is the presence or absence of living pyogenic or tuberculosis bacilli in the exudate. What the specific infective organism may be, whether the streptococcus, staphylococcus, pneumococcus, Friedlander's bacillus, *B. coli*, *B. pyocyaneus*, or the gonococcus, is of significance chiefly with reference to prognosis. The treatment is drainage. A sterile or tuberculous exudate in general may require evacuation, but never by open drainage.

Pericardiocentesis.—Pericardiocentesis is indicated in all cases of suspected effusion in order to establish the diagnosis and to evacuate a sterile exudate in case it is causing embarrassment to the circulation. As a diagnostic procedure it may serve both to establish the presence of fluid and to determine its nature. Negative aspiration, however, does not exclude the presence of an effusion, as emphasized by Jacob[36]. A purulent exudate in the presence of fever, leukocytosis, and other findings characteristic of a suppurative process may be assumed without further investigation to be infected, and open drainage should be instituted at once. If the symptoms pointing to a pyogenic infection are less definite and the fluid proves to be turbid, a culture or direct examination may be necessary in order to establish the presence of living pyogenic organisms. Rarely a tuberculous effusion is frankly purulent and may occur with fever, night sweats, and so forth, suggesting a pyogenic origin. In such cases a sterile culture and a predominance of lymphocytes in a stained smear justify a tentative diagnosis of tuberculous pericarditis; open drainage would almost certainly lead to a secondary pyogenic infection and greatly lessen the patient's chances for recovery.

In cases with large effusion and in many cases with signs of only a very moderate effusion, symptoms of dyspenea, cyanosis, feeble pulse, distention of the veins in the neck, coldness of the extremities, edema, and in some cases, marked pain, are associated. Some writers attribute these symptoms to cardiac weakness and not to the mechanical effect of the pericardial fluid. McPhedran believes "the danger from pericarditis is rarely due to the inflammation of the serous membrane itself, but first to the presence of the accumulated effusion hampering the action of the heart, only an occasional danger, and secondly and chiefly, to the occurrence of inflammation in the walls of the heart itself." That the symptoms in these cases may be largely due to increased intrapericardial pressure is, however, abundantly appreciated by anyone who has seen the immediate relief from pericardiocentesis to a practically moribund patient. In such cases it is life saving.

The reason why a large pericardial exudate or even a rapidly accumulated smaller one may seriously embarrass the return of the blood to the heart becomes clear when it is considered that normally the negative intrathoracic pressure of from 0.3 to 30 mm. mercury (Starling) is transmitted through the pericardium, so that the in-

trapericardial pressure is normally -3 to -5 mm. mercury (Adamkiewitsch and Jacobson). In the presence of a pericardial exudate, owing to the rigid pericardial walls limiting the pressure on the lungs, the intrapleural pressure usually remains but slightly if at all affected. Inside the pericardium, however, I have found that the pressure varied in one case between 6 and 20 cm. of water. A few such observations are also recorded in the literature. Reichard has recorded a pressure of 15 cm. water, Gerhardt, 24 cm., and Hanssen 17 cm. In one of Gluck's cases 250 c. c. of blood sufficed to "strangulate" the heart.

Experimentally it has also been shown by Francois-Franck, Lagrolet, Kuno, and others that in animals a relatively small amount of fluid in the pericardium causes a diminution in the output from the heart, resulting in increased pulse rate. Further increase in pressure causes a fall in blood pressure. Finally, when the intracardial pressure reaches the pressure in the venae cavae and auricles the heart stops. A striking analogy is found in the increased pulse rate, lowered pulse volume, and blood pressure and increasing dyspnea and cyanosis in cases of large rapidly accumulating pericardial effusion.

The site for pericardiocentesis.—There have been much discussion and diversity of opinion on the proper site for pericardiocentesis. Doebert objects that in textbooks sufficient consideration to the subject is not given; in many it is not even mentioned. It is of practical importance chiefly, perhaps, with reference to finding the bulk of exudate in case aspiration of the fluid is attempted therapeutically, and because of the danger of wounding the heart or mammary vessels and the risk of infecting the pleural cavity if a pyogenic bacterial exudate is present and the puncture is made through the pleura.

The position of the heart in the presence of an exudate is of first importance because of the chance of injuring it and the location of the exudate. The old conception first expressed by Scoda and later by many others (Niemeyer, Schrotter, Potain, Trousseau,) was that the heart, being of greater specific gravity than the exudate, sinks backward when the patient lies in the dorsal position. According to this conception there would scarcely be any danger of injury to the heart in the presence of a large exudate by inserting the needle near the sternal edge where the pleura and the mammary vessels are avoided; nor would there be any failure to aspirate the exudate. Clinical experience has shown, however, that it may be impossible to obtain fluid by aspirating at the sternal edge even in the presence of a large exudate, and often the heart has been punctured and blood aspirated, in a few recorded cases with fatal results (Mignon, Calander, Baizeau, Southey, and others). Gluck believes that puncture of the heart may be dangerous in the presence of a degenerated heart and says he has observed two fatal cases. Delorme and Mignon and Frankel believe that the chief danger is wounding the large dilated coronary vein lying in the left longitudinal sinus.

The failure to obtain fluid and the occasional accidental puncture of the heart during aspiration suggested an anterior position of the heart and led to experimentation on the cadaver to determine its position, after injection with plaster of Paris, cocoa butter, gelatin, agar, and so forth, into the pericardial cavity. Such experiments were performed by Goodle, Ferrand, Rotch, Schaposchnikoff, and Damsch, and recently by Williamson. It was found that the heart does not drop back, even when the specific gravity of the fluid is less than that of the pericardial exudate, but that the bulk of the infected material lies below, laterally and posterior to the heart. In some instances there is a thin layer of fluid in front of the heart, in others none. The same findings were noted by Rehm at necropsy in a fatal case of hemopericardium. Gluck writes that the heart lies anteriorly like the patella. He cites a case in which even after pericardiotomy no exudate was obtained until the finger was inserted laterally between the heart and the pericardium. Curschmann points out that the backward dislocation of the heart against the posterior chest wall is impossible on account of its fixation through the great vessels. It must be borne in mind, however, that the anatomic relations may be distorted by a large effusion. Meyer has recorded a case in which the heart at pericardiotomy lay beyond reach of the finger. Frankel and Brentano[8] also have

noted at operation that the heart lies anteriorly. I have also felt the heart beat against the needle in a number of cases; in one such case after evacuation of the fluid the heart could scarcely be reached by the examining finger.

The experiments cited above also bear out the clinical observations that the bulk of the fluid accessible to aspiration usually lies below or to the left, but may be on the right of the heart.

The internal mammary vessels are said to lie from 0.5 to 2 cm. from the sternal border (Gray, Piersol, Delorme and Mignon).

In spite of these observations there is a diversity of opinion on the most suitable position for aspiration. Some surgeons consider the danger of injury to the heart, others the danger of contaminating the pleura, to be the greatest evil. Kocher[40], Strumpell, and Delorme and Mignon, recommend aspiration of the sternal edge, Dieulafoy 6 cm. outside the sternal edge, that is outside the mammary vessels, and Gluck and West outside the mammary line; Curschmann and Damsch state that the aspiration should be performed at the point where the findings indicate the greatest amount of fluid. Frankel has reported two cases, Schaposchnikoff four cases, and Doebert one case, in which aspiration to the right of the sternum was successful (Roberts). Roberts and Marfan advise apsiration in the costoxiphoid angle. Hoffman advises aspiration from behind in certain cases, piercing the lung. Others, among them Lundmark, Brentano[9], Mose, Strumpell, Gluck Sjovall, and Tallqvist, express a preference for a primary pericardiotomy as being less dangerous and more certain of securing adequate evacuation. Kolb believes that in case of negative aspiration open operation is indicated. Souligoux reserves aspiration for hydropericardium.

The great variation of opinion as to the proper site for puncture seems to indicate that all sites have their shortcomings. Rehn remarks that the more numerous the methods, the more sparingly should any of them be used. A very important consideration and one which has a bearing on the whole question is the technic and the needle used for the aspiration. If a large needle or a trocar is used, as seems to have been the rule, it is a matter of considerable importance where and how many times it is inserted. The injury to the heart and mammary vessels may be of grave consequence, and the chances of contamination of the pleura may be considerable. The introduction of the needle without good regional anesthesia is an ordeal for a sick patient. If, on the other hand, a short hypodermic needle is used following local anesthesia, the procedure becomes practically painless and harmless, so that if fluid is not obtained at the point where it would seem most likely to be, further exploration can be done. I have repeatedly aspirated several hundred cubic centimeters of exudate, serous, hemorrhagic and frankly purulent, through a hypodermic needle 4.5 cm. long without the slightest ill effect on the patient. I have also felt the heart beat against the needle in cases with effusion and in cases without effusion, and in one instance aspirated blood, apparently from the auricle, without the least effect on the patient. I submit this technic as one in which the chance of serious harm is negligible, compared with the advantage of a positive proof of pericardial effusion.

Many surgeons caution against too rapid withdrawal of a large effusion. Curschmann employs gravity aspiration. According to his views aspiration evacuates the fluid too rapidly and may produce shock and cardiac collapse. Kolb and Kuttner also recommend very gradual evacuation, and advise against aspiration. Others, on the contrary, use some form of aspiration. On *a priori* grounds it seems illogical to fear bad results from too rapid evacuation in cases of serous effusion, which is usually treated by aspiration, when purulent exudates, with which probably a greatly more frequent and severe myocardial weakness is associated, are drained by wide incision in the pericardium. On two occasions I have emptied an exudation of about 2 liters, in one case by aspiration, in the other by open incision with the patient under local anesthesia, and with frequent observation of the blood pressure and pulse rate. At no time was there the slightest indication of an untoward effect. In other cases the fluid has been aspirated with a 20 cc. syringe without any untoward symptoms attributable to the aspiration.

The question of repeated aspirations arises in case of reaccumulation of a sterile exudate. In most cases the effusion ceases and the remaining

exudate is absorbed after varying intervals, due, according to McPhedran to a restoration of the permeability of the vessels. In some cases, however, notably in tuberculous and hemorrhagic pericarditis, the effusion reaccumulates. McPhedran cites a case in which aspiration was performed thirteen times, but the patient died. In one case at the Mayo Clinic on the service of Dr. Willus I aspirated a hemorrhagic effusion thirteen times. In another case, tuberculous pericarditis, aspiration had been performed three times elsewhere.

In these cases of recurrent effusion injection of air into the pericardium and also open drainage have been advocated. Wenckebach and Weil and Loiseleur report cases cured by this treatment. Alexander recommends air injection to prevent adhesive pericarditis.

Pericardiotomy.—Pericardiotomy with drainage is indicated in cases of non tuberculous purulent effusion. It was demonstrated very early that aspiration is absolutely inefficient. In the nine cases reported before 1889 in which the treatment was aspiration all the patients died (Fevrier). The operation is also indicated to establish the diagnosis in cases in which exploratory aspiration has failed, but if the needle is inserted laterally, on both sides if necessary, or if insertion there fails, enough fluid will probably nearly always be obtained from below to establish the diagnosis. Pericardiotomy is also urgently indicated in cases with large effusion embarrassing the heart in which aspiration fails to evacuate a sufficient amount of fluid to relieve the pressure. There may be trabeculated cavitations in such cases. The open operation has been advocated as a primary procedure also for sterile serous exudates, notably by Kuttner, Lundmark, Rochard, and others. Rochard writes that precardiac puncture is diagnostically untrustworthy, dangerous, and therapeutically inefficient.

Pericardiotomy with drainage would seem always to be a questionable procedure in cases of sterile exudation, even though purulent, as in the case of tuberculous effusion, on account of the probability of infection. It has been argued that in cases of tuberculous effusion open operation with closure might result in an improvement similar to that following laparotomy for tuberculous peritonitis. That in such cases open drainage is followed by unfavorable results, however, as it is following laparotomy for tuberculous peritonitis, is indicated by the fact that recovery was reported in only one of the cases collected by Berteaux. Favorable results following drainage of sterile effusions have been reported, however, by Meyer and by Dowd. Pericardiotomy without drainage performed at the Mayo Clinic in one case with 2000 cc. of tuberculous exudate was followed by marked general improvement, but gradual reaccumulation of the exudate. At a second pericardiotomy in this case drainage into the subcutaneous tissues was attempted after the method described by Jacob[88]. Sufficient time has not elapsed in this case to determine the ultimate results but the indications are favorable.

The technic of pericardiotomy.—In selecting the site for incision and drainage the choice is distinctly more limited than for pericardiocentesis. These limitations are the reflections of the pleurae, the anterior edges of the lungs, and the sternum. The pleural reflections are parallel and run close together behind the sternum from the level of the first rib to about the level of the fourth; the left pleural reflection then deviates somewhat and in variable amounts to the left, leaving a small area behind the fifth, sixth, and seventh ribs bare of pleura. The average point of crossing measured from the sternal edge, according to Luschka, is 1.5 cm. at the fifth rib, 2 cm. at the sixth, and 2.5 cm. at the seventh. Considerable anatomic variations occur, however; Lundmark, in a study of twenty cadavers, found that the pleural reflections in three continued parallel all the way down, in one behind the sternum, in one behind the right sternal edge, and in another behind the left sternal edge. Sick, studying the pleural relations in twenty-three adults, found that the pleural reflection at the level of the cartilage of the fifth rib lay at or within the left border of the sternum in seventeen; at the level of the sixth cartilage the pleural border had not gone beyond the sternal border in ten; at the level of the sternal articulation of the seventh cartilage it was at the sternal border in nine or this cartilage was below its lower border. In eight of twelve children the pleural reflection was at the sternal border at the

level of the sixth cartilage. Dwight, Delorme and Mignon, and others, essentially agree. Rehn attributes many deaths to opening the pleura. He believes that the ideal method is to operate in a differential pressure chamber. In the presence of pleural effusion the tendency is, however, for the lungs to be crowded back, and in the presence of a purulent exudation the Pleural surfaces are probably usually adherent, effectively walling off the pleural cavity. In pericardiotomy the mammary vessels may either be retracted outward or ligated and cut.

Except perhaps in children the operation should be performed under local anesthesia; it is important to remember that anteriorly the intercostal nerves run midway between the cartilages. The pericardium does not appear especially sensitive. On five occasions while operating under local anesthesia without infiltration of the pericardium I have incised it. Harrgan reports a case, however, in which the heart stopped beating when the pericardium was incised with the patient under ether oxygen anesthesia. Heitler and d'Agata, on an experimental basis, recommend cocainizing the pericardium before incising it. Patients who are dyspneic and especially if cyanosed and with a rapid, weak pulse, should be operated on in bed, and every effort made to minimize their discomfort and excitement.

Numerous variations in the type of incision and the position and number of cartilages or ribs resected have been described and recommended. Reichard resects the third and fourth cartilages, Ollier, Gussenbauer[31], and Durand the fifth, Axhausen, Kocher[41], Pels- Leusden, the sixth, Delorme and Mignon the fifth and sixth, Lorey, Mintz, and Rehn the seventh. Berard and Pehu have devised a transxiphisternal route, dissecting the sternum from the diaphragm. Roberts proposed an osteoplastic flap, and Gluck resects the fifth and sixth ribs laterally. Romberg advises rib resection and drainage to the right of the sternum in cases in which the exudate lies to the right. In my experience, resection of the fifth and sixth cartilages has given adequate and dependent drainage. I have found knife section of the cartilage to be less hazardous to the underlying structures than the use of forceps. Von Eiselsberg, Brentano, and Gussenbauer[32] suture the pericardum to the muscle or wound edges in order to protect the pleura. The important considerations in the approach are to avoid opening the pleural cavity and to secure dependent drainage.

The matter of efficient drainage is one of the greatest importance. The presence of recesses in the pericardial cavity on either side of the venae cavae behind the heart, into which the exudate gravitates with the patient in a dorsal position, is the worst possible combination for drainage. When it is further considered that the heart tends to assume a forward position, as I have repeatedly observed, and to form adhesions anteriorly, it is easy to understand how the pus may be encapsulated behind it. Many patients who do well for a time, but who die later, probably succumb because of failure to maintain adequate drainage of these most dependent parts. Kolb and Rehn recommend long tube drainage, one tube passing behind the heart to the right over the inferior vena cava, the other to the left. A reclining posture of the patient has in my experience not seemed sufficient to improve the drainage materially, and it is probably as a rule impractical to have the patient lying face downward.

On account of the difficulty with drainage, the cavity has been irrigated with saline solution and with various antiseptics, such as thymol, phenol, and lysol. Kocher[42] warns against antiseptics and Kuttner uses sterile water. I have used Dakin's solution in two cases of severe hemolytic streptococcus infections. In both of these death occurred from generalized septicemia. It seems noteworthy, however, that one of these patients lived several weeks following drainage of a large bilateral empyema and purulent pericarditis, and with biliary fistula into the pericardial cavity. He died from a hemorrhage into the pleural cavity, probably from the corroding action of the solution on a subpleural abscess cavity, such as was often observed in similar cases during the hemolytic streptococcus epidemic.

An original method of drainage recently described by Whittemore consists in inserting a catheter by means of a trocar and cannula into the pericardial cavity, directing it backward from the left around the heart to the posterior

recess. The pus is aspirated, but no irrigation used. His patient, who had a purulent pneumococcic pericarditis, with double otitis media as a complication, made a good recovery. Possibly this method, combined with Dakin's solution irrigation, may prove to be safe and practical. My preference, however, would be to combine the irrigation with open drainage. Pneumothorax is not a factor in the drainage of pericarditis with effusion.

RESULTS

Venus, in a series of 178 collected cases treated by aspiration, intercostal incision, or rib resection, found the combined mortality to be 56.18 per cent. Ninety-three patients were treated by aspiration; many of these, however, had suppuration from the earlier period before open drainage had been instituted; all of these died. Of ninety-three patients treated by aspiration 62.37 per cent died, 31.18 per cent recovered, and 6.45 per cent were improved. Venus ascribed only one death to the operation. Many of the patients were moribund at the time of operation, and many of these made a temporary recovery. Intercostal incision for drainage was performed in forty-nine, with a mortality of 53 per cent. Rib resection for drainage was performed in thirty-six, with a mortality of 44.5 per cent. Rhodes, in 1915, reported eighty-six collected cases of purulent pericarditis with a mortality of 47.7 per cent. That little progress has been made in lowering mortality is indicated by the mortality of 40 per cent in a series of forty-nine cases collected since 1897 (Porter, Eliot, Rhodes). While mortality will always be high because of the serious nature of the disease conditions with which percarditis with effusion is associated, any lowering of mortality will probably be through earlier diagnosis and treatment, thus forestalling myocardial degeneration, and through more adequate drainage of the postcordial recesses.

Since pericarditis is essentially a complication and not a primary disease, the prognosis and results of surgical treatment must necessarily depend to a great degree on the nature and severity of the primary process. Sears found that of fifty-one patients with pericarditis following rheumatism only 5 per cent died, while of forty patients in whom the condition was associated with other etiologic conditions 80 per cent died. Any attempt to establish the relative merit of various forms of surgical treatment should therefore be through separate studies of results in the various etiologic groups. The available studies furnish the basis for only a very general estimate of mortality and results of treatment.

MAYO CLINIC SERIES

During the last two years nine cases of pericarditis with effusion have been treated surgically at the Mayo Clinic. Four were cases of serous effusion, four purulent, and one hemorrhagic. The primary or associated disease conditions in the cases of serous effusion were (1) bronchopneumonia following thyroidectomy for exophthalmic goiter; (2) pulmonary tuberculosis, myelogenous leukemia, bilateral pleurisy with effusion, and ascites; (3) bilateral pleurisy with effusion; and (4) bilateral pleurisy with effusion and ascites, Pick's syndrome.

In the first case aspiration of 120 c. c. of serous fluid produced a remarkable improvement in the whole clinical picture, and the patient progressed to a complete recovery. In the second case 220 c. c. of fluid was aspirated. The patient died the same day. Necropsy revealed bilateral pleural effusion and ascites and acute miliary tuberculosis involving the pericardium, lung, liver, and tracheobronchial lymph glands. Pericardiocentesis in the third case yielded 50 c. c. of serous fluid. The pleural cavities were aspirated on four occasions, and from 600 to 1600 c. c. of fluid evacuated. The patient was discharged improved. He died at home six months later. In the fourth case, aspiration of 100 c. c. of pericardial fluid was followed by marked improvement. Later the pleural cavities were aspirated, and from 900 to 1350 c. c. of serous fluid evacuated. *Bacillus tuberculosis* was demonstrated in the sputum. The patient was discharged essentially unimproved and died a few weeks later. Necropsy was not performed.

The suppurative pericarditis in each of the three cases was due to a hemolytic streptococcus, in two, of the epidemic type. On one of these cases the pericarditis developed during convalescence following bilateral dissection of the submaxillary triangles for epithelioma of the lip. At exploratory aspiration 350 c. c. of pus was aspirated through a hypodermic needle. The

next day about 200 c. c. of pus was evacuated by open drainage. Dakin's solution irrigation was used in this case, but only after the patient began to show signs of myocardial degeneration following several days of drainage. He died suddenly with symptoms of cardiac failure. Necropsy was not allowed.

The second case was one of epidemic streptococcus bronchopneumonia, with bilateral empyema, following thyroidectomy for adenoma. The empyema was drained by the closed method and Dakin's solution irrigation instituted. Pericardiotomy was performed following two aspirations. The patient died with symptoms of septicemia. The necropsy revealed a bilateral empyema with involvement of the myocardium and liver, and with cellulitis of the chest wall.

In the third case primary pericardiotomy was performed with evacuation of 500 c.c. of pus and secondary drainage of both pleural cavities for empyema of 500 and 1500 c. c. respectively. The pericardial cavity and both pleural cavities were irrigated with Dakin's solution. A biliary fistula developed which drained into the pericardial cavity. The patient lived several weeks, and seemed to have a fair prospect of recovery, when he developed a sudden left intrapleural hemorrhage from which he died. Necropsy was not permitted.

Pericardiotomy was performed also on two occasions in a case of chronic tuberculous pericarditis, which clinically seemed primary in the pericardium. At the first operation the pericardium was sutured following evacuation of 2 liters of purulent exudate. A specimen of excised pericardium showed tuberculosis. The fluid reaccumulated. At the second operation the pericardial cavity was left open, but the skin was closed in an attempt to secure subcutaneous drainage. Sufficient time has not elapsed to warrant a statement concerning the ultimate results following this procedure.

In the case of probable malignant hemorrhagic pericarditis aspiration was carried out on thirteen occasions, and a total of more than 2 liters of hemorrhagic fluid obtained. The site for aspiration was outside the nipple line, fifth interspace, in the costoxiphoid angle, and, after fluid could not be aspirated there, to the right of the sternum. The etiology at the onset in this case seemed very obscure. The Wassermann test was strongly positive and the effusion followed an arsphenamin reaction but microscopic examination of an excised cervical gland showed adenocarcinoma.

The technic in all these cases has been simple. All operations with the exception of one have been performed at the bedside, under local anesthesia. For aspiration a 20 c. c. record syringe with a 4.5 cm. needle has been used. Pericardiotomy has been performed following resection of the fifth or sixth cartilage, or of both. The pleural cavity has not been opened in any case.

SUMMARY

1. Pericarditis with effusion occurs most frequently in association with acute rheumatism. Other primary disease conditions commonly associated with it are pleurisy, pneumonia, the acute general infections, tuberculosis, and chronic nephritis. In children pericarditis usually follows pulmonary or pleural infection.

2. The most characteristic symptoms are increased precardiac dullness, feeble or absent heart sounds, absent apex impulse, small rapid pulse, dyspnea, and cyanosis. The onset may be insidious and the symptoms latent.

3. Exploratory pericardiocentesis may be necessary to establish the diagnosis of the presence of fluid and its nature.

4. Exploratory pericardiocentesis with a short hypodermic needle which infiltrates the tissues with novocain as it enters is as simple and painless and will probably prove equally as harmless as exploratory aspiration of the pleural cavity.

5. The point of election for aspiration seems to be in the region of the left mammary line, fifth interspace, just inside the left border of dullness. In case aspiration here is negative alternative points are beneath the xiphoid process (Marfan) at the left sternal border and at the right sternal border in the fifth interspace.

6. A negative aspiration at any one point, especially at the left sternal border, does not exclude the presence of fluid.

7. A serous effusion is usually sterile, but it may be infected. A purulent exudate is usually infected, but it may be tuberculous or secondary to malignant disease.

8. Preliminary partial evacuation of any exu-

date may probably be accomplished during exploration through an aspirating needle and a small syringe.

9. A sterile exudate, except the persistently recurring type, should be evacuated by aspiration through a small short needle.

10. An infected exudate should be evacuated by pericardiotomy after preliminary resection of the cartilage in order to secure wide open dependent drainage.

11. If the patient is critically ill a bedside operation under local anesthesia is especially indicated. Knife section of the cartilage obviates the necessity of freeing it from underneath before it is resected.

12. Owing to anatomic variations in the reflection of the left pleura, a transpleural operation may be unavoidable. In suppurative pericarditis the leaves of the pleura, however, probably are adherent, and thus wall off the pleural cavity.

13. The most dependent parts of the pericardial cavity on each side of the vena cava must be reached in order to secure the most efficient drainage and to prevent possible encapsulation of exudate behind the heart.

14. Irrigation by promoting evacuation of the exudate seems to be a rational measure supplementary to drainage.

15. The mortality rate, which is high on account of the severity of the primary disease conditions especially with which purulent pericarditis usually is associated, will probably remain relatively high; however, it may probably be reduced materially by the earliest possible diagnosis, prompt evacuation of any exudate causing mechanical embarrassment to the heart, and by wide open adequate drainage in the infected type of the disease.

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DISCUSSION

DR. F. A. WILLIUS, Rochester: A discussion of the operative treatment of pericarditis with effusion presupposes a correct diagnosis. I have enjoyed the paper by Dr. Hedblom very much, and it is not my intention to detail the signs and symptoms of pericardial effusion. However, I wish to emphasize a few points which are very important in the recognition of a condition which is very frequently obscure.

The signs and symptoms of pericardial effusion are two-fold: first, those from impediment to the circulation from the presure itself, and second, the symptoms arising from the infectious process, if the effusion has an infectious basis. The first factor I wish to emphasize particularly.

The symptoms from a mechanical standpoint are two-fold: first, whether the effusion is developing rapidly, and second, whether or not the effusion developing is large in amount. You will recall that the normal pericardial contents are about 30 c.c., and the normal pericardium does not distend until 100 c.c. are present. These figures are approximate. In moderate or large pericardial effusions which are developing rapidly certain phenomena are present which are very important. A pulse rate which progressively accelerates, with diminishing amplitude of contraction, should attract attention to pericardial effusion. This has a physiologic basis. A heart beating against increased resistance on all sides must diminish its amplitude of contraction, and the compensating mechanism to prevent circulatory failure is pulse acceleration to maintain volume out flow. This can only be accomplished in one way. With this status the patient does not die of infection, but dies of mechanical impediment to the circulation, unless this is relieved. With a chronic pericardial effusior, which develops over weeks or months, the cardiovascular system has had time to adapt itself to the increased load which is largely accomplished by muscle hypertrophy which favors increased amplitude of contraction.

Recently I had the opportunity of examining a patient with primary tuberculosis of the pericardium of 14 months duration, and at operation two liters of fluid was obtained. That patient at no time was running a pulse rate exceeding 100, so that the question of adaptation to the increased fluid is extremely important. I think that any case that presents a progressively accelerating pulse rate with diminished amplitude of contraction, dyspnea, cyanosis of the head and neck, must attract attention at once to the presence of a rapidly developing pericardial effusion.

DR. W. H. MAGIE, Duluth: This paper reminds me of a case of supperative pericarditis that came under my observation many years ago. The case was particularly interesting because it was mistaken for a case of empyema; the dullness extended around to the axilliary line. We had only seen the case a few hours before operation. We inserted a needle and found pus, and our diagnosis was circumscribed empyema. The man had been sick about a month, and after we had resected a couple of ribs and evacuted the abscess we came into the pericardial sac. The sac was very much thickened, and we could see the heart and handle it as well. This case simply showed that sometimes the collection in the pericardial sac is so great that it often passes beyond the nipple line extending around to the axilliary line. This patient recovered, as far as the pericarditis was concerned, with drainage. After about eight weeks the man had gained twenty pounds in weight. He suddenly developed multiple phlebitis and died of it in a short time. How the pus entered the circulation, I do not know, as the drainage wound had been entirely closed for several weeks.

DR. A. C. BAKER, Fergus Falls: I think the technic Dr. Hedblom has given us is of a great deal of importance to the average practitioner, especially since we have seen a great many more of these cases of pericardial effusion in the last three or four years; and since the epidemic of influenza every man has seen a great many cases of multiple serositis, including pericarditis with effusion. When one reads up on these things he finds that the ordinary textbook tells us that there is a great deal of danger in aspirating the pericardial sac; at least, that is the impression I get from the literature as we have it today.

I think one thing Dr. Hedblom brought out, and which should be impressed upon most of us, is the fact that probably 100 will die because of lack of recognition of the pericardial effusion where one is being taken care of. There are one or two cases that have been reported in the literature of death from aspiration. In aspirating in the midline just to the left of the sternum many times one cannot get any fluid because the heart is raised toward the chest wall. You think you are mistaken in your diagnosis, while if you use the technic he has described employing a small needle, if you touch the heart, you do not do any damage, your diagnosis is made, and a great deal of help can be given to the patient. His technic is the important thing, and one that all of us should use.

DR. CARL A. HEDBLOM, Rochester (closing): I

only wish to emphasize two points, one of which is that there are probably scores of cases of pericarditis with effusion found at postmortem to every one that is recognized in vivo and properly treated.

The second point is, that if one attempts to aspirate in case of pericarditis with effusion for the relief of the intracardiac pressure which Dr. Willius mentioned, it is necessary to exercise patience, if one uses a small hypodermic needle. I had a case of hemorrhagic effusion which illustrates that point very well; I inserted the needle outside of the left nipple and got about 100 c.c. There was a stoppage of the flow; I moved the needle a millimeter or two and in a short time the flow was re-established. We continued aspiration and drew off about 1400 c.c., and the improvement in that patient, who had been almost moribund, was very striking. If, after a persistent attempt, one fails to get fluid at the nipple line, the needle should be inserted near the sternum or underneath it, in the xiphisternal angle. The important point is that it requires patience and a considerable amount of time to aspirate the fluid through a fine needle.

DERMATOLOGY AND INTERNAL MEDICINE*

S. E. Sweitzer, M. D.
Minneapolis, Minn.

Highman, in his recent book, defines a dermatologist as an internist who knows the skin. This somewhat idealistic state is not always reached, I am sorry to say, but an endeavor will be made here to show the intimate connection between dermatology and internal medicine, and to emphasize the necessity for closer co-operation between the two specialties.

Hebra, the great Viennese dermatologist, was the pioneer in the study of skin diseases. He and his followers assumed that all dermatoses were peculiar to the skin and denied any general causes for them. The French, on the other hand, early began to reason that all dermatoses had an internal, or general, causation. Modern dermatology has taken a middle ground between these two extremes and we are endeavoring to co-ordinate cause and effect.

Certain diseases, such as nephritis, diabetes, the leukemias and anemias, either predispose to cutaneous eruptions or have as part of their symptomatology definite cutaneous lesions. This is particularly true of the leukemias and a blood examination is called for in many cases of chronic itching dermatoses. The skin manifestations in leukemia are very numerous, but the ones most commonly seen are the thickened eczematous-like, itchy patches.

*Presented before the Minnesota State Medical Association, Duluth, August, 1921.

The question of food sensitization, or idiosyncrasies to various articles of diet is a very important one, especially as regards the infant. Roughly classifying infantile eczemas we can say that the moist forms usually show a fat indigestion, the dry forms a disturbance of the carbohydrate metabolism. If neither of these are the cause, it may be due to the milk or to egg albumen, and if not these, may be a deficiency in thryoid secretion.

In certain of the generalized eczemas in adults, it may be of great help to reduce the diet to a minimum and often a fat-free diet will do more than any one thing in the prevention of relapses, which are so common in these conditions.

Errors in diet influence to a greater degree than commonly supposed, the course of the seborrheas and the acnes. This is especially true in acne rosacea, a disease of middle life which occurs more often in women than in men, and is very disfiguring; any procedure that will help in its cure and aid in preventing its recurrence, is well worth while. In this disease, the elimination of meat from the diet and the substitution of vegetables is of the greatest value.

In seborrheic dermatitis, we often find a disturbance of the fat metabolism; these patients frequently eat too much meat and fats, such as cream and butter; a fat-free diet is indicated here.

In acne vulgaris we must look out for the starches and sugars, although close study of these cases metabolically show no real change that we can assume to have an etiological bearing.

In diabetes, the skin may be normal, be slightly inflamed, itch more or less, become infected with pus organisms, or become gangrenous.

Cases of furunculosis should be examined for sugar in the urine, and a blood sugar examination will sometimes show an increase in this disease before sugar is found in the urine. In such cases, a proper regulation of the diet is again indicated.

The question of focal infections is continually coming up in a dermatological practice; abscessed teeth often seem to be the exciting cause of pustular lesions of the face. Rarely are they the cause of a generalized dermatitis. Recently a herpes zoster of considerable extent was seen. The pain was very severe but relieved at once on the removal of an abscessed tooth.

In erythema multiforme, we must look for some hidden focus of infection. Diseased tonsils, or abscessed teeth, may be removed with the hope of preventing recurrences.

In erythema nodosum, we have a condition

that may be due to a streptococcic infection or, as some of the later writers assume, it may be due to tuberculosis. These cases call for a very careful examination to determine the cause of the disease and its removal if possible.

Lupus erythematosus may possibly be associated with focal infection as in one case seen a year or so ago; the removal of a few teeth caused a generalized outbreak of acute lupus erythematosus with apparent involvement of the lungs and death ensued after a long period of high temperature.

The large group of occupational dermatoses are of especial interest at this time, on account of the new compensation law—mechanics, bakers, workers in flaxseed, painters, furniture makers, photographers—to name only a few of the many occupations that are especially prone to have dermatitis result from longer or shorter work in various chemical substances. Lately, it is quite common to see an occupational dermatitis on the hands of dentists due to either apothesine or novocaine. Some of these patients go or many months without the cause being discovered. A dentist seen recently would not believe that his trouble could be due to the use of novocaine. An attack of appendicitis, with a subsequent stay in the hospital, caused his hands to heal up completely. In such cases, a change to some other anesthetic can be tried.

The question of tuberculosis in its relation to the skin is a large one. In this climate, however, we do not see so much of this as in other localities. An exception must be made in the case of the so-called "tuberculids" as they are more frequent.

Recently, in a case of malignant endocarditis, a number of localized infarcts occurred in the skin of the fingers especially. This is a condition seen in certain other infections that are carried by the blood stream.

CONCLUSIONS

The enumeration of these few conditions show the necessity of many cases of closer study than we were in the habit of giving a few years ago. The use of blood examinations and blood chemistry, with often complete physical examination and metabolic study, will be found necessary in many of our cases. Co-operation with a good internist is of the utmost aid in many of our dermatological problems.

625 Syndicate Bldg.

DISCUSSION

DR. N. L. LINNEMANN, Duluth: As Dr. Sweitzer has tried to point out, dermatological diseases are not considered local disturbances and have not been so considered for some time back. Dermatology, like other specialties, has not been at standstill and we have learned that the skin manifestations may only be symptoms of the real trouble. Hebra and others have thought they were local diseases, but we have realized that they are not. For instance, in a case seen here recently—a lady aged fifty years who had for fifteen years had a rash during the summer months had to go to bed during June, July and August. Examination showed hypertension and some albumin. She was placed on the regulation diet, diuretin was given as internal treatment, and this year for the first time in fifteen years she has been able to be around and has had no trouble with her skin. If we were not able to examine our patients carefully we certainly would not find these conditions. As Dr. Sweitzer stated, in the acne group—particularly acne rosacea, we want to be sure of the diet, especially in middle life. The acne vulgaris is not so important. He did not mention the skin lesions due to syphilis, which are so often treated for eczema, and unless a blood examination is made no cure will be effected. These cases are usually so spectacular that two or three doses of arpshenamine will clear up the rash. I do not mean to be understood that the disease will be cured, but the rash will clear up.

He mentioned the internist, but it seems to me quite as important to have the pediatrician and the nose and throat man see these cases as the internist, because in many instances they have an infection of the nose and throat and we would not expect to have the internist see these cases. In babies, we have been accustomed to see the cases with the pediatrician and there is no question but that the pediatrician has the bulk of the work in these cases. I have long ago ceased to treat these eczemas alone.

In other words, dermatological lesions are not local, but we have to study our patient as a whole, as other specialists do, and in that way we are much more likely to arrive at a definite diagnosis.

DR. ARTHUR H. SCHWARTZ, Duluth: I was very much pleased to hear Dr. Sweitzer's paper and am glad he brought out the importance of group study of dermatological conditions. I agree with Dr. Linnemann that the examination should be quite general and not confined to the internist. As to the question of acne and diet, and that includes the seborrheas, I have for a long time believed that diet played no part in acne or seborrhea. I have taken the stand that it is due rather to an endocrine disturbance and have regulated the diet effect on hypo- or hyperglandular secretion and think I have gotten further along in these conditions. Other conditions that arise very frequently are the urticarias and allied dermatoses. We have found these are often due to the focal infections. What I wish to bring out is the question of infection in the sinuses. We have found many of the giant urticarias and dermographias to be due to sinus infection. I also recall a case seen recently of lupus erythematosus which was cured by an operation which incidentally developed for some gynecological disturbance.

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EDITORIAL

THE SOUTHERN MINNESOTA MEETING

The annual meeting of the Southern Minnesota Medical Association, which took place early in December at Mankato, met the expectations of the members and showed that same enthusiasm which has always typified the meetings of this society. The meeting was well attended and the papers were presented largely by representative physicians and surgeons of the southern part of the state. In marked contrast to the meeting a year ago there were very few addresses by visiting physicians. The subject which received the most consideration was that of cancer. It is startling, even to the physician, to learn that cancer kills more than twice as many human beings each year as were lost in our army during the world war. The very definite marked increase in deaths due to cancer in recent years is also cause for alarm, and it would be well for the medical profession in general to concentrate on the subject of cancer in an endeavor to meet this serious situation.

Mankato lived up to its reputation as an entertaining host and the social side of the convention was not lost sight of.

The next meeting of the association will be held at Rochester. The following officers were elected:

President—Dr. W. F. Braasch, Rochester.

Vice Presidents—Dr. W. H. Condit, of Minneapolis, and Dr. E. G. Luedke, of Fairmont.

Secretary-Treasurer—Dr. H. T. McGuigan, Red Wing.

Dr. A. F. Schmitt, who has done such splendid executive work for the association during the past eight years, was re-elected secretary-general.

ST. PAUL CLINIC WEEK

Elsewhere in this issue of the journal appears an outline of the various activities planned for Clinic Week in St. Paul, January 10th to 13th.

Certain medical meetings, those of the American Medical, State Medical and Southern Minnesota Medical Associations, are entirely didactic. Last year St. Paul Clinic Week was almost entirely clinical. A happy mixture of these two methods of medical instruction has been arranged for the meeting this winter.

Questions are often asked regarding the value of medical meetings. That medical meetings are becoming more numerous and that attendance does not decrease, indicates the demand for professional associations of this sort. The information contained in the essays presented is not all the attraction. If this were so we would all stay at home and read our journals. Seeing others work is not in itself so valuable. But there is an intangible something, perhaps nothing more than an inspiration, derived from contact with the recognized leaders of the profession. In attending a clinic there is the opportunity to see how others handle those little details, the observance of which means perfection. Then too we all have that human instinct for association with those interested in the same field of endeavor.

THE SHEPPARD-TOWNER BILL

The new Sheppard-Towner bill for maternity and infant welfare, as passed by Congress November 19, 1921, bears little resemblance, we are told, to the original bill. In short it provides ten thousand dollars the first year and five thousand each year for five years there-

after to each state for administration work, and a percentage, according to population, of a million dollars each year for six years providing a state submits in detail an acceptable plan for the dissemination of "instruction in the hygiene of maternity and infancy through public health nurses, consultation centers and other suitable methods." The bill is directed against the high infant and maternal mortality in the nation, and may rightly be termed preventive in nature.

The bill was framed with the avowed purpose of placing the method and administration in the hands of each state with the provision that the plan submitted is to be approved by a committee of three in Washington. The apportionment is contingent upon appropriations by each state, and, although a rather trifling amount, will serve to stimulate state action.

In Minnesota a bill was passed at the last session of the legislature which provided for the protection of maternity and infancy but carried no appropriation. This bill authorized the State Board of Health "to provide instruction and advice to expectant mothers during pregnancy and confinement and to mothers and their infants after childbirth." It is restricted to residents in the state and provides that no woman shall be affected in her civil or political rights nor have her identity disclosed except by written order of the board. The board is empowered to make reasonable rules and regulations, accept private gifts, cooperate with other agencies, make investigations, and report to the legislature its activities. The state of Minnesota accepts the provisions of any act of congress providing for cooperation between the government of the United States and the several states in solving problems for the protection of maternity and infancy. It empowers and directs the board to cooperate with the Federal Children's Bureau in carrying out the purposes of such an act. The state of Minnesota is, therefore, in a position to derive whatever benefit may accrue from the passage of the federal law providing ten thousand dollars is immediately provided for beginning this work. After June 30, 1922, only five thousand dollars will be available for the ensuing years until the legislature sees fit to make further appropriation. Just what method of procedure the Children's Bureau will advocate has not been announced. If the bill will help to reduce maternal and infant mortality it will accomplish a desirable result. Time will tell.

It is interesting to note that our legislators in drawing up the final form of the bill took cognizance of the objections expressed in various medical journals.

We must admit that we see no opening wedge for social insurance in this bill as passed. On the other hand, we believe that the display of sound business sense at Washington, and as little government interference with ordinary business relations through control and taxation, will do more for the health of the average American than numerous bureaus and departments. Health is the accompaniment of individual prosperity.

GOVERNMENT OWNERSHIP OF THE PROFESSION

Every member of the profession in the state should make a point of reading the leader in this issue on Social Insurance by Dr. Dennis. We can assure the reader that he will find the article delightful and, what is more important, instructive on a live issue of the day. Although the associated labor unions and the organized medical profession have put themselves on record as opposed to this form of government activity, there is a very appreciable element in the country, for the most part radical and socialistic, that is pushing compulsory state health insurance.

We have expressed ourselves editorially on several occasions as unalterably opposed to either federal or state management of health (or sickness) insurance. That is, we are opposed to government ownership of the medical profession as we are opposed to government ownership of any other profession, public utilities in general or any activities which can be run by private individuals or corporations. And why? For one reason because it has been proven over and over again in our country and before our eyes that government management is extravagant and inefficient. We need only mention the Panama Canal and the recent fed-

eral control of the railways. The working out of government insurance in Great Britain and Germany surely proves that government ownership of the medical profession does not work to the advantage of either the public or the profession. Will it be necessary for us as a nation to follow in the footsteps of Germany and Great Britain before we are convinced?

As Dr. Dennis has ably pointed out, there will be a department of clerks and office holders, more or less under the influence of politics, with the accompanying red tape and paper work, and the vast number of medical calls for petty complaints will make painstaking medical analysis impossible and reduce practice to a clerical job.

There are certain medical activities which must of necessity be handled by the government. The control of contagion is perhaps the activity of first importance. The federal government has deemed it necessary to furnish treatment in its attempts to control venereal contagion. Many states have provided sanatoria in the combating of the tuberculosis scourge. The larger cities are offering free diagnosis and the services of a squad of nurses in their fight against the spread of tuberculosis. As a rule the activities of government in the medical field are in the realm of preventive medicine and should be so restricted.

ANTHRAX, AND THE CHEAP SHAVING BRUSH

A contemplation of the role that bacteriology has played in modern medicine calls attention to anthrax as one of those diseases that has been controlled in the past fifty years. Even as recently as the decade from 1890 to 1900 there were reported in Italy 24,052 cases of anthrax with 5,812 deaths. There are still sections of the world where anthrax is not an uncommon disease, although the percentage of deaths has been greatly reduced since the use of anti-anthrax serum.

A most interesting review of the entire subject of the treatment of anthrax and the mortality statistics has been published recently by Dr. J. C. Regan[1] of the Kinston Avenue Hospital, New York City. This review points out the disadvantages of various methods of local therapy and calls attention to the actual danger that many of them possess. The plan of dosage and the interval between doses of anti-anthrax serum is described. The serum prepared by the Bureau of Animal Industry, or according to its method, has been proved of marked potency, being according to certain reports twice the strength of European preparations. In connection with this report the review of Schall[2] of fifty-one cases treated at the Massachusetts General Hospital from 1888 to 1918 is of interest. The mortality in these cases was 13.7 per cent. However, 44 per cent of the patients treated surgically died, while there was a mortality of only 7 per cent in those treated non-surgically.

Within the last five years the interest of the medical profession has been centered on anthrax because of the history of "malignant pustule" appearing in men who have recently used new shaving brushes, so that at present the danger that lurks in the cheap shaving brush is well recognized. Such brushes are often made with horsehair imported from China, Japan, or Siberia. Smyth[3], in investigating the anthrax problem in horsehair, found virulent anthrax bacilli in Chinese hair imported under consular certificate, while none was found in domestic hair. He has reviewed the methods stipulated by the Bureau of Animal Industry for sterilization of horsehair, but recommends even more thorough sterilization before imported hair is considered safe for use. In fact, nothing short of absolute sterilization by steam under pressure for sixty minutes at 15 pounds when the hair is in bundles, and two hourss at 15 pounds for baled hair, is considered safe by this writer.

The attention of the public has been recently called to the danger that lurks in the cheap shaving brush, in a recent issue of the New York Times[4]. The death of Michael F. Farley, former representative from the Fourteenth Congressional District, caused by anthrax contracted from a shaving brush, is the occasion for this

1. Regan, J. C.: The advantage of serum therapy as shown by a comparison of various methods of treatment of anthrax. Am. Jour. Med. Sc., 1921, clxii, 406-423.
2. Scholl, A. J., Jr.: Anthrax: comparison of surgical and nonsurgical methods of treatment. Jour. Am. Med. Assn., 1920, lxxiv, 1441-1444.

press comment. It is stated that of thirty-four cases of anthrax in New York City in the past nineteen months, twenty have been contracted from shaving brushes. There was a total of eleven deaths in the thirty-four cases, nine of the patients were shaving brush victims; the other two deaths were caused, one by infection from a tooth brush, and the other by infection from a scrubbing brush.

Major F. D. Francis[5] of the Medical Corps, United States Army, cites a typical case of shaving brush infection in a soldier, similar to many that occurred during the mobilization of troops. In the conclusion of his article Major Francis states: "A list of firms furnishing standard acceptable brushes has been published by the Surgeon General."

It is the duty of the physician to inform and warn the public, whenevr occasions arise, against the use of brushes that are not guaranteed by the manufacturer to be sterilized.

A. H. S.

3. Smyth, H. F.: The anthrax problem in horsehair. Jour. Indust. Hyg., 1920-1921, ii, 423-432.
4. New York Times, October 10, 1921.
5. Francis, F. D.: Report and remarks on a case of anthrax. Mil. Surgeon, 1921, xlix, 306-309.

OBITUARY

IN MEMORIAM*

DR. C. D. CONKEY

Mr. President,

Members of the Interurban Academy of Medicine:

Eight years ago I removed from my home in Illinois to Superior, Wisconsin, being, as was then supposed, a hopeless invalid. For a long time after that event I was indeed very sick. Then, merely by chance, I formed an acquaintance with your old comrade, Dr. Conkey. The doctor, being appealed to concerning my condition, diagnosed my case correctly, operated, cured my chief difficulty—suppuration of the maxillary antrums—and saved both my sight and my life. The acquaintance, thus begun, strengthened into friendship—a friendship which continued uninterrupted until rudely broken by the stern hand of death. Will you not, therefore, accept it as in some degree fitting that I, who am so deeply indebted to our old friend, should bring before you my ineffectual endeavor at an appreciation of his character and life.

Charles Dewitt Conkey was born at Pontotoc, Miss., Dec. 1, 1856. His childhood was passed amid the fragrance of the magnolia and the wild rose, for he was a great lover of nature even in his tender years. Before the age of seven, indeed, he had formed the habit of seeking out the pleasant places where flowers were and the great southern trees. His love of nature remained with him till the day of his death. At the age of nine Charles removed with his parents to Appleton, Wis. Here he soon joined the Presbyterian church, of which he was ever an active member. When he had received his high school diploma, he decided to follow his father's occupation—that of school teaching. And he did indeed teach school, though only for a single year. Then he entered Lawrence College, at Appleton. Having completed at Lawrence the first two years in arts and sciences, he migrated to Rush Medical College, Chicago. From this institution he received his degree in 1882. For the next eight years the doctor practiced general medicine at Larimore, N. D. Then, in 1889, he studied the eye, ear, nose and throat at the New York Post Graduate Medical School, and in 1890 located in West Superior, now Superior, Wis. He was the first physician in the northwest part of the state to confine his practice to ophthalmology and oto-laryngology. To Superior, Dr Conkey restricted himself for fifteen years, for three years of which time he was a partner with Dr. Detling. In 1905, however, he opened a supplementary office in Duluth, and, for about ten years, divided his time equally between Duluth and Superior. Then he became a member of the Duluth Clinic, in which institution he remained as oculist and aurist in conjunction with Dr. Winter, for five years, devoting all his hours of practice to Duluth but keeping his place of residence in Superior.

At Larimore, N. D., on Nov. 4, 1886, Dr. Conkey had married Mary Ellen Taylor. By her he had two children—Charles Dewitt and Ruth Taylor Conkey. At the end of the period above mentioned, which the Doctor spent in the Tuohy-Hirschboeck Clinic, he was obliged, by reason of his wife's rapidly failing health to select some less rigorous climate than that which prevails at the Head of the Lakes. He therefore only two short months ago, left with his wife and daughter for Los Angeles, California, meaning to make that place his home. There he bought a house, rented and equipped an office. Just before he left Superior he was given a banquet and a keepsake by the members of the Douglas County, Wisconsin, Medical Society—a fact which has now become a source of especial satisfaction to those who gave.

In 1910 Dr. Conkey had undergone, in Duluth, a gall-stone operation. The wound had not healed well, and, a few weeks after the operation, the Doctor, while bowling, produced a hernia through the

*At the Nov. 16, 1921, meeting of the Interurban (Duluth-Superior) Academy of Medicine, the following appreciation of Dr. C. D. Conkey was read by Dr. T. H. Shastid, of Duluth. Dr. Conkey (who at the time of his decease, was well known throughout the Northwest) was the first physician in north Wisconsin to limit his practice exclusively to the eye, ear, nose and throat.

operation scar. From that time on, he had worn a truss. After moving to Los Angeles, the Doctor and his wife, on Labor Day, had spent some ten or eleven hours in motoring, and that night, the Doctor, feeling great pain, arose, and discovered that the hernia had very much increased in size. Next morning, accordingly, he entered a hospital, and, the day thereafter, submitted to an operation. For a time all seemed to be well, but the following forenoon at eight o'clock, the Doctor's heart began to fail and in the evening he died. This was on September 8, 1921. It will be a pleasure to the members of this Academy to know that Dr. H. J. O'Brien and Dr. Detling, both formerly of Superior, and the latter at one time a partner with Dr. Conkey, were present at the operation, and indeed were with him practically all the time until the end. Dr. Conkey, though suffering considerable pain, spoke often of his old friends in Superior and Duluth. He was also frequently engaged in forming plans for the further enjoyment of natural scenery in and about Los Angeles. The funeral was held with perhaps an accidental appropriateness, at The Little Church of the Flowers. The interment was at Forest Lawn Cemetery, near Los Angeles. So short a time has elapsed while all these recent things were happening, that we who knew Dr. Conkey well, seem still to almost hear his voice about us, still to behold him moving to and fro at his daily tasks. It appears indeed only about five minutes since I saw him waving at me a rake and hoe and calling out cheerfully "Now for the garden!"

Dr. Conkey's personal appearance needs no detailed description to this Academy. He was five feet, nine inches high, a little inclined to stoutness, with close-cropped white hair and no beard. A man of fine physique, his capacity for toil knew almost no end.

The Doctor's facial expression was always one of calm thoughtfulness and gentleness. Nor did this expression in the least belie his true character. For the keynotes of that character were simply these—calm thoughtfulness and gentleness. Dr. Conkey I never knew to be excited. Nothing ever carried him away, ever swept him off his feet, lured him into violence. Yet, cautious in occupying a position, once he occupied it he held to it tenaciously.

Perhaps this calm, placid, unhurried nature explains to some extent his excellence as a diagnostician. At all events, in the realm of diagnostics it was that Dr Conkey excelled particularly. I have sometimes thought that he could almost smell a disease out. He used to carry in his memory, as now I recall, list after list of points on differential diagnosis. And over almost any diagnostic problem he would ponder with a patience that is seldom seen. I behold him once again, as he sat before me on the day he diagnosed my own particular case: cross legged, a roentgen picture uplifted in his left hand, pondering, pondering. At length said he, "Pus"—one brief, monosyllabic conclusion, but, for me, an open sesame to incredible health and happiness.

Dr. Conkey was a man of great faith: faith in his fellowmen, faith in his profession, faith in his personal friends, his lodge, his church, his God. He used to say that the best way to help any one was to believe in him. So he believed in every person steadfastly, till the evidence was overwhelmingly against that man. Even then he believed more or less. He did not seem able to give up wholly his confidence in any one. This great faith in humanity seems in some sort to have been connected with his gentleness and tendency to ponder.

In turn, out of his great faith in humanity grew his wish to serve. Service and love were, in fact, his watchwords. To every patient, rich and poor alike, he endeavored to be of the utmost use. Not infallible, yet, in that calm, placid, unassuming manner, his whole soul went to his professional activities.

Out of his gentleness also grew a very striking characteristic of this man—his charitableness toward his brethren in the healing art. Wholly independent as he was in the formation of his opinions, he could not be easily hurried into prejudice. Over and over when I have heard some fellow physician castigating another in that other's absence, Dr. Conkey has entered at least some plea in the absent one's defense I have even heard him do this when the absent one was a bitter enemy of his own. His nature was too gentle, too full of placid discrimination for him to fail to see that, in almost every controversy, there must be a second side.

Dr. Conkey, as general practitioner and as specialist, practiced medicine for almost forty years. Forty years of service to his Creator and to his fellowman; forty years filled with thrilling experienced, light and shadows, ups and downs—the lot of the doctor specialist or general practitioner, everywhere. And now the places that knew him will know him no more. His calm bearing, quiet and gentle dignity, splendid physique, intense application, independence of spirit, and charity toward all, have become but a shadow, a mere memory, a name.

This, gentlemen, is a very strange world. The Doctor who saved my life has lost his own. He it is that lies in the darkness of the grave, while I whom he rescued am still in the light and in life. Only a few short weeks ago, as now it seems, the Doctor was standing before this very body, reading a contribution, as now do I. Strangely enough, the name of that paper was "Diseases of the Maxillary Antrum." Strongly tempted was I, on that night, when he had finished reading, to arise and acknowledge before you my great indebtedness to this excellent man and skillful ophthalmologist and rhinologist. But I feared that I might embarrass him. Little did I dream how soon without the least confusion to the Doctor, I might stand before you, lifting my humble

voice in a strangely inadequate eulogy of his character and life.

Life, gentlemen, life and death are both, strange, incredible. We cannot at all understand them. We only know that, for a season, one and another comrade is walking beside us: we see him, we listen to his voice; then, either with solemn warning or without, he leaves the road we were happily treading together, waves good bye, and is gone along some path of no return. At least so far as this life is in question there can be no return. Let us hope that, under the infinite mercy of a loving God, and in the great hereafter (which cannot be one whit more wonderful or miraculous than this life) all paths shall come together again, all friendships be renewed.

Patrick Henry Manion, M. D., Eyota, Minn., graduated from Rush Medical College, 1890, died recently, aged 57.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

CLINIC WEEK, ST. PAUL

The second annual session of the St. Paul Clinic Week will occupy Tuesday to Friday, January 10th to 13th inclusive.

The following will act as the Executive Committee for the Ramsey County Medical Society:

E. M. Hammes, M. D., Chairman.
E. M. Jones, M. D., Secretary.
F. E. Burch, M. D.
C. C. Chatterton, M. D.
E. V. Goltz, M. D.
L. A. Hilger, M. D.
O. W. Holcomb, M. D.
H. M. Klein, M. D.
J. C. Staley, M. D.
H. B. Zimmerman, M. D.

Clinics at the various hospitals will occupy each morning from 8 a. m. to 1 p. m., and a symposium consisting of essays by the local members of the profession will take place each afternoon from 2 to 4 o'clock. Visiting physicians will address the meetings the latter part of the afternoon.

On Monday afternoon and evening, January 9th, the Northwest section of the American College of Surgeons will conduct a meeting which will be addressed by Drs. Franklin Martin, George W. Crile, Harry C. Deaver, Allen B. Kanavel and John M. T. Finney.

Tuesday's symposium will be on "The Disturbances of the Thyroid Gland," to be followed by an address by Dr. Isaac Abt, of Chicago, on "Dilatation of the Colon in Children." Tuesday evening the Northwest Medical Officers' Association of the World War will have its annual meeting.

Wednesday's symposium on "Obstetrical Problems" will be followed by an address on a subject of interest to the internists, by Dr. Charles L. Mix, of Chicago. An entertainment for the visiting physicians and their wives will be provided in the evening.

Thursday the symposium will be on the subject of "Right-Sided Abdominal Pain." The addresses following will be on an eye and ear and a nose and throat subject, the titles and speakers to be announced later. Thursday evening the annual banquet of the Minnesota Academy of Ophthalmology and Otolaryngology, to which all visiting physicians are invited, will take place.

Friday afternoon a symposium on "Tuberculosis" will be followed by Dr. J. C. Bloodgood in an address on "Bone Tumors."

The Ramsey County Medical Society, at its regular meeting November 28, 1921, elected the following officers for 1922:

President, Dr. John C. Staley; vice president, Dr. E. G. Sterner; secretary, Dr. E. M. Hammes; member of Finance Committee, Dr. John M. Armstrong.

Dr. H. E. Binger presented a paper with slides on "Indications for Mastoidectomy."

The Clay-Becker County Medical Society held their annual meeting at Moorhead on November 18, 1921. The meeting was addressed by Dr. Arthur T. Mann, of Minneapolis, and a resolution deprecating the situation resulting from the recent ruling of A. W. Melon, Secretary of the Treasury, whereby physicians are entitled to prescribe wine and beer, was passed. The following officers were elected for 1922: President, Dr. C. H. Patterson, of Barnesville; vice president, Dr. G. L. Gosslee, of Moorhead; secretary and treasurer, Dr. H. J. Thornby, of Moorhead.

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

The thirty-eighth semi-annual meeting of the Southwestern Minnesota Medical Society was held at the Hotel Thompson, Worthington, Minn., Thursday, Nov. 10, 1921.

The following physicians were visitors at this meeting: D. W. Craig, G. G. Cotton, Thos. J. Billion, R. G. Stevens, M. A. Stern, Dr. Gregg, S. A. Keller, Fr. Putnam, E. D. Putnam and Dr. Parsons all of Sioux Falls, S. D. Drs. H. J. Brackney, G. E. VerMeer, and W. R. Brock of Sheldon, Iowa. Drs. R. Gurimette and L. B. Williams of Worthington, Minn Drs. Roy Andrews, J. W. Andrews and Carl J. Holman, Mankato. Dr. F. C. Schuldt, St. Paul and D. S. Basinger, Mountain Lake, Minn.

Dr. B. O. Mork of Worthington presented a resolution against the recent ruling of Secretary Mellon in regard to the liquor status which was carried by a unanimous vote.

The following officers were elected: President, Dr. B. O. Mork; vice president, Dr. F. M. Metcalf; secretary and treasurer, Dr. W. A. Piper; censor for Rock

county, Dr. C. O. Wright; censor for Pipestone county, Dr. W. J. Taylor; censor for Nobles county, Dr. F. M Manson. Drs. F. G. Watson and A. G. Chadbourn were elected delegates to the State Meeting. Alternates Drs. C. L. Sherman and H. Doms.

The program as rendered:

"Mistakes"—Dr. A. G. Chadbourn, Heron Lake, Minn. Discussion by Drs. Lowe, J. W. Andrews, Carl Holman and Roy Andrews.

"Etiology and Diagnosis of Rachitis"—Dr. Walter Halloran, Jackson, Minn. Discussion by Drs. Knudson, Sogge, J. W. Andrews, Roy Andrews and Hoegh.

"Diagnosis and Treatment of Traumatic Injuries of the Spleen and Pancreas"—Dr. R. G. Stevens, Sioux Falls, S. D. Discussion by Drs. Holman, Stanley, Brock and Hoegh.

"Marginal and Jejunal Ulcers following Gastro-Enterostomy"—Dr. F. C. Schuldt, St. Paul. Discussion by Drs. J. W. Andrews and Basinger.

"Acute Pancreatitis"—Dr. F. M. Manson, Worthington, Minn. Discussion by Drs. Waller, Schuldt and Metcalf.

"Prostatic Hypertrophy"—Dr. B. O. Mork, Worthington. Discussion by Drs. Schuldt, Andrews and Holman.

The Minnesota Pathological Society of the University of Minnesota Medical School, Institute of Anatomy, held a meeting on Tuesday evening, November 15, 1921, at which papers were presented by Dr. Wm. Carpenter MacCarty and Dr. Donald W. deCarle.

This meeting was exceptionally well attended and an inspiration to all. The next meeting will be held at Heron Lake, Minn.

William A. Piper, Sec. and Treas.

OF GENERAL INTEREST

Dr. W. Chamberlain, of Waseca, has been spending several weeks in the East where he visited many of the large hospitals.

The marriage of Dr. William H. Von der Weyer and Miss Mildred M. Esswein, both of St. Paul, took place during October, 1921.

Dr. Lauritz Ylvisaker, of Minneapolis, has been appointed on the staff of the St. Paul Hospital, and has moved his offices to St. Paul.

The engagement of Dr. M. F. Eusterman, of the Mayo Clinic, Rochester, to Miss Brazzell, of Luverne, has been recently announced.

Dr. J. O'Neil, of Nashwauk, has given up his practice at that point and has moved to Manistique, Michigan, where he will make his future home.

Dr. J. B. Stevens, who has been associated with Dr. Chas. L. Sherman for the past year at Luverne, has moved to Sioux Falls where he expects to engage in the practice of medicine.

Dr. C. B. Lenont, of Virginia, recently visited Philadelphia where he attended a session of the American College of Surgeons. Dr. C. W. More, of Eveleth, also attended the meeting.

Dr. C. J. Rowan, Professor of Surgery at the University of Iowa, gave a Mayo Foundation lecture, "Cause of Failure of Operations for Chronic Appendicitis," Tuesday, December 6, in the Assembly Room.

Dr. M. George Milan, medical director of the Oakland Park Sanatorium, of Thief River Falls, attended a meeting of physicians, superintendents and officials connected with health bodies of the state, recently held in Minneapolis.

Countess Irene di Robilent, Associate manager of the Italy-America Society, delivered a lecture before the meeting of the general staff of the Mayo Clinic, Novmber 23; her topic was "Italy's Social Evolution and the Italians of Today."

Dr. W. J. Dowswell, formerly of Bellingham, has become associated with Dr. Oscar Daignault, of Benson. Dr. Doswell has spent the past eight months in Chicago where he has been taking a post-graduate course in eye, ear, nose and throat work.

Dr. Nesmith Nelson has located in Brainerd, having taken the offices formerly occupied by the late Dr. C. S. Reimestad. Dr. Nelson is a graduate of the George Washington University of Washington, D. C., and of the Manhattan Eye, Ear, Nose and Throat Hospital of New York City.

Colonel McCarrison, of the medical service of Great Britain in India, spoke at the meeting of the general staff of the Mayo Clinic Wednesday, November 30, on researches on goiter from 1902 to 1921. He gave a Mayo Foundation lecture Friday, December 2; his topic was "The Effects of Faulty Food on the Gastro-Intestinal Tract."

The administrative board of the Medical School of the University of Minnesota, at its meeting on November 2, 1921, took the following action: That after consideration of the report of the Committee on Survey of the Medical School, the Administrative Board unanimously voted its approval of the administration of Dean E. P. Lyon.

The first examination of the National Board of Medical Examiners will be held in Philadelphia February 15th to 21st inclusive. Applications for examination should be received not later than January 15, 1922. Application blanks and Circulars of Information may be obtained by writing to the Secretary, Dr. J. S. Rodman, 1310 Medical Arts Building, Philadelphia.

Dr. C. H. Mayo was recently appointed Brigadier General in the Medical Reserve Corps of the United States Army, under an order issued by the War Department. General Mayo served in the office of the Surgeon-General during the War and rendered invaluable assistance in the re-organization of the medical department on the scale demanded by war-

time activities. He was awarded the distinguished service medal.

Dr. H. C. Jacobeous, of Stockholm, Sweden; Dr. G. Gasteneta, of Lima, Peru; Dr. S. Meri, of Dairen, South Manchuria; and Dr. F. A. Nyulary, of Melbourne, Australia, visited the Mayo Foundation and Mayo Clinic November 14, 15, and 16. Dr. Jacobeous, Professor of Internal Medicine at the Medico-Chirurgical Institute of Stockholm, gave a Mayo Foundation lecture on the use of the thoracoscope, Monday, November 14.

Dr. C. H. Gardner, commanding officer of the Aberdeen Public Health Service Hospital, was tendered a reception on Tuesday evening, November 8th, by the various organizations interested directly and indirectly in the work being done by the government for the former soldiers in St. Paul. Representatives attended, among others, from the Knights of Columbus, American Legion, Junior League, Girls Community Club and Shubert Club.

The attention of the medical profession was called, in the September issue of the journal, to the institution of a course by one of the laboratories in St. Paul devoted to the training of office assistants in laboratory work. Any physician desiring to obtain an office assistant who has completed this course and has prepared herself in the keeping of accounts and the performance of routine laboratory work should communicate with the office of the journal.

The National Health Exposition, occupying 60,000 square feet of floor space, will be held in the Jefferson County Armory at Louisville, February 1-9, 1922. This is under the auspices of the United States Public Health Service, State Board of Health of Kentucky, Jefferson County Board of Health and the Health Department of the City of Louisville. It will include exhibits in hospitalization, nursing, dentistry, medicine and pharmacy. The University of Louisville, the public school system, and various local, state and national health organizations will participate.

The annual conference of the city and county health officers, the annual convention of the Kentucky State Public Health Association and other health meetings are already scheduled in connection with the Exposition.

An institute will be conducted by the United States Public Health Service and its program will include: Dr. M. J. Rosenau, Dean of the Harvard School of Public Health; Dr. Josephine Baker, Director of the Department of Child Hygiene, New York Board of Health; Dr. Wm. A. Evans, former Health Officer of Chicago and the most distinguished public health editor in America; George T. Palmer, President of the Illinois Tuberculosis Association and Director of the Bureau of Tuberculosis of the Illinois State Board of Health; Dr. Frederick E. Greene, Secretary of the Council on Health and Public Instruction, American Medical Association; Dr. Valeria H. Parker, Director of the Interdepartmental Board of Social Hygiene; Dr. John H. Stokes, distinguished syphilographer of the Mayo Clinic; Dr. Frankwood Williams, Director of the National Association of Mental Hygiene; Dr W. S. Rankin, State Health Officer of North Carolina, a member of the Council of Health and Public Instruction of the American Medical Association and recently President of the American Public Health Association; Dr. John Dill Robertson, Health Officer of Chicago; Dr. John R. McDowell, Director of Health for the Lake Division, American Red Cross; Dr. John R. McMullen, United States Public Health Service, and Miss Frances Brink, Director of the National Organization for Public Health Nursing.

Expenses will be paid through the sale of Commercial exhibit space to a limited number of reputable firms.

A similar Health Exposition is scheduled for Minneapolis March 20th to 25th, 1922.

A delegation of Serbian physicians, guests of the Rockefeller Foundation, visited the Mayo Foundation October 27 and 28. The delegation is composed of Dr. G. J. Nikolitch, Undersecretary and first medical officer of the Ministry of Health of Serbia; Dr. G. Joannotitch, Professor of Pathologic Anatomy, and Dr. R. Stankovic, Professor of Internal Medicine, in the Belgrade Medical School. Dr. Frank B. Stubbs, of the Rockefeller Foundation, and Dr. Henry John, of Cleveland, accompanied the delegation.

Sir Robert Wood, President of the Royal College of Surgeons of Ireland, Sir William Taylor, ex-president of the same organization and Professor Shoemaker, of The Hague, visited the Mayo Clinic November 1, 2, and 3. A meeting was held in their honor in the lobby Wednesday, November 2 at which time Sir Robert Wood gave a brief talk on education in Ireland; Sir William Taylor discussed the organization of the Royal College of Surgeons of Ireland, and Professor Shoemaker spoke on several ingenious operations on the stomach and colon which he had originated.

Dr. W. J. Mayo delivered the John B. Murphy Memorial Address before the meeting of the Clinical Congress of the American College of Surgeons in Philadelphia at which meeting honorary fellowship in the Royal College of Surgeons of Ireland were conferred upon him and Dr. C. H. Mayo.

The following is quoted from a letter from Dr. C. H. Lavinder, Acting Surgeon General of the United

States Public Health Service, to Dr. A. J. Chesley, Secretary of the Minnesota State Board of Health:

"On November 1, the United States Public Health Service opened a venereal disease clinic at Hot Springs, Arkansas. This clinic is made possible through the cooperation of the National Park Service of the Interior Department under whose jurisdiction the Hot Springs National Park is operated.

"The clinic is operated in a government building which has just been completed at a cost of $300,000. One floor of the building is devoted to free baths for indigents. The other floor is devoted to the venereal disease clinic.

"The venereal disease clinic is not being established to attract venereals from other communities. For many years venereals have been coming to Hot Springs and one purpose of establishing the venereal disease clinic is to take care of the many indigents—soome of whom are an interstate menace—who come in large numbers for treatment.

"It is the intention of the Public Health Service to extend to physicians, nurses, laboratory and social workers an opportunity for intensive work and instruction. The clinic is divided into syphilis and genitourinary sections. In addition all specialties will be represented on the consulting staff. The active staff has been selected from among the best men in Hot Springs. In addition to the resident staff physicians, the Public Health Service hopes to have some of the best specialists in the country deliver lectures at the clinic.

"Physicians and others desiring to receive instructions must make application to the Surgeon General, United States Public Health Service, Washington, D. C. No fees are charged for this instruction. All persons must provide their own maintenance. Physicians will be required to remain a minimum period of one month.

"The Public Health Service makes no pretense that in this short space of time it will be possible to make specialists of those who attend. It is hoped, however, to teach the primary principles of the diagnosis and treatment of syphilis, gonorrhea, etc. Opportunity will also be afforded to specialists for participating in intra-spinal and other advanced work.

"Graduate nurses will be admitted for instruction in venereal disease nursing. The nursing staff will be under a supervision of a hospital superintendent of nurses. The laboratory will be conducted by an officer of the Public Health Service, and research work by the staff and student physicians will be undertaken and encouraged. Social workers will be admitted for instruction in work relating to venereal disease cases.

"Application blanks, rules and regulations for operation of the clinic and any further information can be secured by writing the Surgeon General of the United States Public Health Service, Washington, D. C."

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

November 9, 1921

Dr. H. L. Staples presiding.

Dr. George Douglas Head reported the following cases:

Case I. Chronic Adherent Pericarditis.

Chronic adherent paricarditis manifests itself in clinical forms often difficult to interpret. This is the silent type of the disease in which the condition is only discovered at autopsy and the patient gives no evidence during life of its existence. There is the second, the cardiac type, in which the patient presents the usual picture of advanced cardiac disease with partial decompensation. These cases are frequently interperted as chronic endocardial or myocardial lesions, and with this diagnosis go to the autopsy table. There is the third form of the disease which might be well called the cirrhosis of the liver type, which is not so well recognized and understood and which is frequently misinterpreted. In this condition, recurring ascites, enlargement of the liver, and ill-defined cardiac signs dominate the picture. These cases are often puzzling because they present the signs of cardiac decomposition, without the high grade edema of the lower extremities usually manifested in this condition. The case which I have here to report is a typical example of the cirrhosis of the liver type of chronic adherent pericarditis.

Mrs. H. B., 27 years, married, no children. Gives a history of normal health up until about eight years ago, when she had an attack of acute inflammatory rheumatism, from which she recovered without complications. The tonsils were removed three years ago. She had a right sided pleurisy with effusion in 1919. The same year she also had an attack of influenza, after which time she did not recover her usual health. One year ago this fall, she first noticed a swelling in the abdomen. It came on without pain. If she would lie down and keep quiet the swelling would go away in two or three weeks. If she would stay upon her feet it would return. The swelling in the abdomen was not associated with any marked swelling in the legs. She did, however, have some puffiness of the face, also some cough. She also noticed that her breath was getting short, especially if she walked fast or climbed stairs. Her appetite was fair. She slept well. She went into a hospital at St. Cloud and was kept in bed for four or five weeks, when the abdominal swelling disappeared. She then got up and about but so soon as she got on her feet again the abdomen began to fill and again she went to the hospital where she was put to bed and the swelling in the abdomen disappeared. She was told that her abdomen was full of fluid. She had no nosebleeds. Bowels were regular. No fever. The en-

largement of the abdomen with the presence of fluid has now returned the fourth time.

Examination: Patient was a woman of slender build. Marked cyanosis of the lips and cheeks, with a choked appearance to the face. Physical examination was negative for organic disease outside of the enormously enlarged heart, with signs of an adherent pleuritis in the right lower pleura and the large amount of fluid in the abdomen, with some enlargement of the liver. There was slight edema of the lower extremities. The heart was of tremendous size, the left border being at the anterior axillary line, the right border about 6 cm. to the right of the midsternal line. The heart was fixed in its position. In spite of the tremendous size of the heart no murmurs could be heard at any of the orifices. A distinct systolic tug, Broadbent's sign, could be made out in the fifth and sixth interspaces on the left at the outer margin of the cardiac area of dullness. The sounds were of good quality. The heart was very steady, about 95 to the minute. The abdomen contained a large amount of fluid. In a sitting position it reached to the transverse umbilical line. The liver was palpable about two fingers' breadth below the costal margin in the mammary line. The Wassermann was negative. The urine findings were negative except for a trace of albumin. The blood showed a mild secondary anemia. The clinical diagnosis of chronic adherent pericarditis was made, which the x-ray findings confirmed. You will notice in the films I have here calcareous plates imbedded in the pericardial wall, outlining very distinctly the pericardium in close proximity to the heart wall. In that position of the pericardium resting against the diaphragm, the calcareous deposits present a continuous solid wall, showing a gluing together of the pericardial surfaces and the heart wall. The condition is incurable but the patient may be able to survive a number of years under proper methods of living.

Case II. Chronic Mitral Disease of the Heart, with Pneumonia and Fibrinous Casts of the Bronchial Tree in the Sputum.

Mrs. C., 45 years, married, no children. Ill for many years with chronic endocarditis of the mitral valve, mitral stenosis and insufficiency. Had maintained a fair degree of compensation until April 17. 1921, when she began to have severe attacks of dyspnea, associated with cyanosis and numerous rales of the sibilant and moist bubbling type throughout both lungs, anteriorly and posteriorly. The heart was rapid and the heart sounds rather feeble in quality, with a loud double murmur at the apex area transmitted toward the axilla, and an accentuated pumonary second sound. The attacks of dyspnea were severe. During the attacks the heart became rapid, 120 to the minute. Patient was required to sit up in bed to get her breath. The sputum was frothy, tinged with blood, and mucopurulent. About half a cupful of this material came up during a paroxysm. The diagnosis of acute edema of the lungs was made, associated with chronic endocarditis of the mitral valve. From this time until October 10, 1921, patient was seen at various times. On September 8th she developed a sudden severe attack of pain in the region of the spleen, which was interpreted as an embolus with infarct in the spleen. On September 24th she complained of an attack of pain in the lower right chest, associated with increased cough, which was interpreted as an infarct in the lower lobe of the right lung. On October 10th patient was again seen with fever, cough, signs of consolidation in the base of the right lung behind and a leucocytosis of 18,200. At this time a diagnosis of pneumonia of the lower right lobe was made. On October 12th, after a severe coughing spell, accompanied by a good deal of dyspnea and cyanosis, patient coughed up a solid plug of fibrin showing the branching arrangement of the bronchial tree. (Water-color drawing exhibited.) Patient was then relieved for a number of days, when, on October 19th, a much smaller fibrinous cast was coughed out, and again, on November 7th, a much larger solid plug was gotten out after a severe fit of coughing. Patient was much relieved after each of these plugs was coughed out. The examination of the plug and of the sputum coughed up following the plug showed large numbers of pneumococci, with a streptococcus viridans in the culture from the sputum. (Specimen exhibited.) Since the coughing up of the last plug patient's condition has improved steadily. In the struggle to get out the fibrinous casts, patient's heart became very much tired out and she presented all the signs of a high grade decompensation, with considerable edema of the lower extremities. The administration of hydriodic acid or potassium iodid seemed to be of considerable help in loosening up the bronchial casts.

Case III. X-ray photographs were shown of the long bones of a case of osteomalacia in a patient, Mrs. John T., 57 years of age. The x-ray photographs were shown through the courtesy of Dr. Ernest L. Baker, with whom the patient was seen in consultation. The features in differential diagnosis were discussed. The Wassermann was negative in this case. No Bence-Jones body in the urine. The blood smears showed no evidence of malignant disease of the bone or of the bone marrow. No spontaneous fracture had occurred at any joint. No metastatic growths had developed at any point in the body, all of which features were considered sufficiently good grounds for the exclusion of myeloma or malignant disease. No Turck's irritation forms, myeloma, or other abnormal cells were found in the blood. The x-ray pictures, while showing diffuse, generalized rarification areas throughout all the bones rayed, did not present the usual picture of a malignant disease of the bone or bone-marrow. The case will be reported in full at a later time by Dr. Ernest L. Baker.

Discussion by *Dr. A. Schwyzer.*

The second report given by Dr. Head is a very rare condition of which I happen to have seen two cases. They were here in my own practice.

The first case I saw I put one of the casts between two glass plates and it was considerably larger than this one Dr. Head has shown. It was so large that after floating it in water you could put a good sized lead pencil into the largest bronchial tube. The patient had casts every two or three months. The woman felt severely ill and became cyanosed but had no fever. All at once she would have a severe coughing attack and was relieved after removal of the cast. I do not remember the later history.

The second case was not quite as severe and that was more of an acute condition. Judging from the size of the largest tube, the cast must have been from the bronchus of the lower lobe at least.

Dr. W. H. Condit reported the following cases:

Case I. Rupture of pregnant uterus. Mrs. O. D. Clinic No. 3160.

Past History: Negative for any severe illness. Patient aged 27. Gravida two. Three years ago had first pregnancy, went to full term and was said to be in labor for one week with moderate pains, when she was operated by Cesarean section and delivered of a full term child, said to weigh 10½ pounds, now living. The puerperium was complicated by peritonitis and drainage, phlebitis of the left leg, and was confined to bed five weeks.

Present History: On June 21, 1921, consulted me for care in her expected confinement—then in her fifth month. She made monthly visits at the office and had an uncomplicated anti-partum period. Expected date of maturity November 29th, 1921. On September 26, 1921, patient had mild pains in the abdomen early in the morning. Had a luncheon at 11 o'clock, consisting of canned beans. At 2 o'clock was seized with an extreme pain in the abdomen and vomited her luncheon. Was admitted to the hospital at 3 p. m., suffering severe abdominal pain in the upper abdomen in the region of the gall-bladder and some pain in the appendiceal region.

Examination: Abdomen quite distended and extremely tender all over. Hemoglobin was 65 per cent; leucocytosis 19,400; urine normal. No rhythmical contractions to suggest labor pains, having general disseminated pain over whole abdomen. Consultations at 6 p. m., 8 p. m., and 11 p. m. resulted in the decision that the patient was not in labor—was administered sedatives morphin and chloral at 11 p. m., 1 a. m. and 5:20 a. m. At 10 a. m. patient was much more distended, leucocyte count 22,000, pulse 140, temperature 100.4. A diagnosis of intrauterine or intraabdominal hemorrhage or both was made and immediate operation advised.

Operation: Incision was made parallel to the old abdominal scar. Uterus was hard, contracted with a wall 3 cm. thick. Suggested immediately a myomatous uterus with an abdominal pregnancy, as a water tumor was palpable extending from the fundus up against the diaphragm. This was ruptured and did not contain the fetus. A rupture of the uterus was found through which the membranes with the entire amniotic fluid had been delivered and the buttocks of the child presented. This rent was enlarged and the fetus and placenta immediately delivered. The uterus was sewed with three layers of chronic gut and the abdomen closed as quickly as possible, the patient being in quite extreme shock. Stomach lavage before returning to the room, twice daily for 2 days. Forty-eight hours following delivery the patient was in good condition.

Case II. Recurrent Abdominal Pregnancy. Mrs. R. T. H., age 27, admitted to hospital April 8, 1920, with a diagnosis of acute appendicitis, complicating a six months' pregnancy. Last day of menstruation October 28, 1919. First noticed pain December 1919, and was in bed until February 19, 1920. Pain was very severe—patient lost rapidly in weight and strength. She was married six years ago, lived with first husband two years, was then single two years, and has had two miscarriages since the second marriage—both of two months' gestation. Her menstruations had always been regular twenty-eight day type, beginning at age of 13 and always normal. Blood pressure on examination was 130 systolic, 70 diastolic. All other functions and organs normal. Hemoglobin 58 per cent; leucocytes 13,280; P. M. N. 84; R. B. C. normal; Wassermann negative.

X-ray plate shows a fetal skeleton in mid-abdomen of at least six months' gestation; fetal heart sounds present. To the right of the large tumor, which undoubtedly is the membrane with the fetus, is a hard mass, which is undoubtedly the uterus.

Abdominal pregnancy was suspected, but no definite diagnosis made. After one week confinement in bed, patient was dismissed with instructions to report if pain became worse or if she had any bleeding. No fetal heart sounds heard; diagnosis of death of fetus made.

On May 25, 1920, patient called at office with a bloody discharge from the vagina and extreme abdominal pain. Operation the following day.

The uterus was found to be crowded under the right side of the symphysis pubis. Fetus was in the amniotic sac, macerated and deformed. Fetus was removed and peritoneum of patient was stitched to the border of placenta, which filled whole lower pelvis. Any attempt to remove placental tissue was accompanied by profuse bleeding. The wound was lightly packed and left for Nature to dissect off the placental tissue. Patient was confined in bed seven weeks and left hospital at end of eighth week in good health and continued in good health at her regular duties of a clerk until May 1921.

At that time she began having abdominal distress, accompanied by nausea, vomiting, inability to retain any food other than milk. She had one menstrua-

tion in June, flowed for two weeks in July. On July 28th, her hemoglobin was 78 per cent; leucocytes 11,200; P. M. N. 83; R. B. C. 4,000,000. She had a large abdominal tumor the size of her head. This tumor was soft and very tender under palpation. The diagnosis of an acute abdomen with the possibility of another abdominal pregnancy was made. Operated the 30th of July, and a live, 3½ months fetus was found intact in the membranes. Hemorrhage was most severe following delivery of the fetus. A five-yard roll of gauze was packed in the wound and left for four days, when we began removing it fractionally. The placental attachment was on the parietal peritoneum on the left side. The patient had an eventful convalescence and is at the present writing in good health.

D. H. L. Staples reported a case of hysterical hyperpyrexia.

A young healthy married woman had engaged in an exhaustive horseback race, also received very disturbing news concerning her husband. Menstruation just established. That night had a severe chill with a sharp rise of temperature, nausea and pain in the left ovarian region. Next day a more pronounced chill with higher temperature. Menstruation ceased. Third day chill and temperature of greater severity. Fourth day same condition continued. Heart, lungs, urine and blood normal. No abdominal rigidity. Quinin had no effect on chill or temperature. Uterus and appendages apparently healthy. Fifth day severe chill lasting over an hour followed by temperature of 107. A disturbing letter that morning received. The forenoon temperatures were nearly normal. No regular time for evening chill. She was removed to the home of her mother and more favorable news was received. Aside from a slight weakness at first, she has been perfectly well since the fifth day. This is a purely psychic condition induced by emotional disturbance. Some authors deny the existence of such a state.

Dr. A. Schwyzer reported the following cases:

Case I. A case of very large and movable cystic gall-bladder. The patient, a lady of about 35 years, had been advised to use a belt for her "floating kidney". This mass flopped back into the right kidney lodge, and could be pushed entirely beyond the midline over to the left. It was possible to make out its attachment to the liver. The diagnosis of cystic gall-bladder could thus be made. The patient also had an interesting appendix. Six years previously I had advised operation for appendicitis. The proximal half of the appendix was rather normal in appearance. The distal half was like a small plum, a little larger than the distal phalanx of a thumb. It represented a cystic remnant of an old perforating appendix. On freeing the tip from the mesenteric border of a nearby ileum loop the contents of the cystic appendix, a purulent slime, came partly out. There was a cavity of 1 cm. diameter at the mesenteric border of this ileum loop.

Case II. The second case, which had been operated upon in the morning, showed a large gall-bladder, which we had to remove together with some liver tissue, as it was impossible to separate it from the liver. Two large and nine smaller acute perforating ulcers were the cause of this. It was an empyema of the gall-bladder with large stones. The pus was under great tension and let the gall-bladder appear very hard. The patient, a lady, was 64 years old. The two large ulcers were old and really healed, only representing diverticula-like depressions with a very thin wall. The nine small ulcers were all acute and from four to six millimeters deep. The area of these ulcers correspond on the outer side with the area where liver tissue had to be taken along with the gall-bladder. Thus we avoided spilling any of the pus.

Dr. J. G. Cross, presented a case of hypernephroma.

Mr. H. A. M., age 58, traveling salesman; of excellent family and personal history; rather overweight and somewhat florid. It was learned that he had consulted a physician because of an appearance of blood in the urine in 1917. The patient stated that he was cystoscoped, with no positive findings and the blood cleared up after two or three days. Patient stated that to his best recollection he was told that he had probably passed a small stone, and that he probably would have no further trouble. As the hematuria cleared up after two or three days and did not reappear, this was presumed to be correct.

In 1918 he was found to have a trace of albumin and a few hyaline casts in his urine, the diagnosis at this time being a mild chronic interstitial nephritis.

In December 1920, the patient noted a blurring of his vision. His physician, Dr. Willcutt, made careful physical examinations, including that of the urine, repeatedly, with negative findings. An oculist made one or more changes in his glasses which apparently did not help his vision, the blurring continuing to be slightly troublesome. The patient was otherwise well and continued at his occupation as traveling salesman.

On the evening of March 3rd he was one of a party at his club and ate heartily that night of a duck dinner. During the evening while playing cards with his brother and two other friends he evidently had a cerebral insult with a tonic convulsion. He was brought to Hillcrest Hospital in an ambulance, where I saw him at midnight with Dr. Willcutt.

Examination at that time showed that he was perfectly conscious and intelligent, but had a motor asphasia with partial loss of power in the right arm and leg with some relaxation of the facial muscles on the same side. Pupils were unequal, but reacted. There was a positive Babinski and Oppenheim on the right. No other reflexes were examined at that

time. Urine obtained at this examination showed a three plus albumin, no sugar, but was loaded with hyaline and granular casts. No blood was noted at this time. Examination of the urine the next day showed very marked improvement in the urine with a normal output, and in a few days an entire disappearance of both albumin and casts. Speech was entirely normal on the second day, and aside from a slight headache and weakness the only complaint was pain in the back which was attributed to trauma incident to his convulsion. The pupils continued unequal, but other reflexes were normal after the second day. Blood pressure was 150 over 95.

He remained in the hospital for about one week. and was apparently making an uneventful recovery. He went home and continued in bed for about six weeks. There was nothing noteworthy in his condition during this period except for a marked tenderness low down in the back. About this time patient began to have a very low temperature usually going up to about 100 in the afternoon. This lasted for about three weeks and no apparent cause was found. There was slight edema noted only in the middle third of both legs. The urine up until this time had remained practically constant, showing a specific gravity of 1020, and a trace of albumin, with no hyaline or granular casts, microscopic examination showing only an occasional pus cell. At about this time, however, for one or two days only the albuminuria was slightly increased, and granular and hyaline casts were again found in the urine. This condition, however, immediately cleared up again. From this time onward the patient began to complain of headaches which were increasingly severe. These headaches were distinctive in that they had their onset about 4:00 o'clock in the morning and would let up about noon, after which he would feel comparatively well for the rest of the day. They were located by the patient as over the temporal portion of the skull. There was a remission in his symptoms for two or three weeks, during which time he was more active than before—riding out, and even changing tires on his car. These attacks, however, returned with greater severity than before so that it was thought advisable on one occasion to give him morphin by hypodermic, but without any result. They were influenced slightly by aspirin or phenacetine.

The characteristic headache in the early morning and remission in the latter part of the day continued as before. Patient, however, had more nausea with his headaches, and lost in strength. Urinalysis at this time did not show any increase of renal symptoms. Blood chemistry never showed any retained nitrogen or increase of creatinin content. Wassermanns were always negative.

No greater complaint was made of vision, but ophthalmoscopic examination made by Dr. McCarthy and myself showed such marked changes in the disc that an oculist was immediately called, who pronounced the condition one of beginning optic neuritis. Examination of his eyes from this time on showed progressive increase in this condition until the typical choked disc appearance came on in both eyes. Blood pressure varied from 120/90 to 170/110.

In view of the increasing headaches and the optic neuritis, Dr. A. S. Hamilton was asked to see this patient about the 25th of June, but he did not feel that there was sufficient evidence of brain tumor to justify operation, especially in view of the fact that there were no localizing signs of any kind. At this time, however, patient complained of difficulty in using the muscles of the right side of the face. To the observer, however, this was perfectly normal. X-ray plates were taken of the skull which did not show any signs of increased pressure. The condition became progressively worse and on July 9th patient became comatose. At this time he was again seen by Dr. Hamilton and also by Dr. Corbett, and a decompression was done the same night. Intracranial pressure was very great. Following the decompression patient was badly disoriented mentally, but had an auditory aphasia. For two days following the operation he passed a large amount of blood in the urine. This, however, cleared up after this time. Patient returned to his home after a stay of ten days in the hospital. He had marked bulging over the decompression area.

Examination on July 25th it was noted that the mental coordination was fair only; speech somewhat thick; hearing very poor (the mental coordination was so poor that we were unable to obtain satisfactory results from the Rinne and Weber tests). Left eye seemed somewhat protruded. Left corner of mouth drawn down. Reflexes of right arm definitely not as active as those of left. Muscular power of left less than right. Reflexes and muscular power apparently normal in both legs. Pointing tests normal. Blood pressure 120 over 70.

Condition continued about the same until August 5th when he was again operated by Dr. Corbett, who was, however, unable to remove the tumor. Patient died two days later.

Autopsy revealed an hypernephroma of left kidney as the primary growth. The brain tumor was of such size as to obliterate the left ventricle by pressure. Photographs of both tumors and microscopic study proved that the two tumors were similar and therefore associated, the brain growth being metastatic.

Dr. Henry L. Ulrich read a paper entitled "On Some Functional Tests of the Heart". Three charts were shown.

The meeting adjourned.

HARRY P. RITCHIE,
Secretary.

NEW AND NON-OFFICIAL REMEDIES

During November the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies:

G. W. Carnrick Co.:
Amylzyme Capsules.
Merck and Co.:
Bromipin 10 per cent.
Iodipin 10 per cent. Tablets.
Powers-Weightman-Rosengarten Co.:
Theobromine-P. W. R.
Schering and Glatz:
Xeroform S. and G.
E. R. Squibb and Sons:
Diphtheria Immunity Test (Schick Test)—Squibb.
Diphtheria Toxin-Antitoxin Mixture—Squibb.

Eastman Barium Sulphate for Roentgenology.—A brand of barium sulphate for Roentgen-ray work—N. N. R. (see New and Nonofficial Remedies 1921, p. 58). Eastman Kodak Company, Rochester, N. Y.

Kalmerid Germicidal Tablets Potassium Mercuric Iodid.—Each tablet contains mercuric iodid 0.29 gm., potassium iodid 0.58 gm., ammonium chlorid 0.12 gm., eosin "Y" 0.0005 gm., and yields, when dissolved in water, potassium mercuric iodid 0.5 gm., with an excess of potassium iodid. For a discussion of the actions and uses of potassium mercuric iodid, see New and Nonofficial Remedies 1921, p. 198. Davis and Geck, Inc., Brooklyn, N. Y. (Jour. A. M. A., Nov. 12, 1921, p. 1573).

Iodipin 10 per cent.—An iodin addition product of sesame oil containing from 9.8 to 11.2 per cent of iodin in organic combination. It acts in the system similarly to the inorganic iodids. It is not broken up in the stomach, but a portion of the iodin is split off when it enters the intestine; the remaining compound is readily absorbed, and, as in the case of other fats is largely deposited in the tissues, where it is slowly split up. Because of this behavior the action of iodipin 10 per cent is exerted more slowly than that of the inorganic iodids. The dose is from 4 to 16 cc. (1 to 4 fluid-grams) three or four times a day. Iodipin is not marketed as such, but in the form of iodipin tablets 8 grains. Merck and Co., New York (Jour. A. M. A., Nov. 19, 1921, p. 1655).

Endocrinology and Pseudo-Endocrinology.—R. G. Hoskins, professor of physiology, Ohio State University College of Medicine, pleads for a greater degree of discrimination on the part of physicians in evaluating not only proper data but also the various agencies either seeking support in, or exploiting, this field. The latter aspect of the situation deserves special emphasis. Those who purpose acting as purveyors to the medical profession must accept the status of purveyors. The physicians or laboratory investigator of the medical sciences shall not exploit for commercial gain the result of his studies. At the present time a commercial campaign is being carried on by a "laboratory" purporting to specialize in endocrine products. The mail of physicians is flooded with a series of postcards, each card recommending and suggesting the use of the proprietary product of this self-styled laboratory for conditions ranging from eczema to epilepsy, and from obesity to tuberculosis. This free postcard advice is reinforced by reference to "monographs" and a trade journal in which scientific medicine is systematically belittled as unpractical. This advertising campaign is ostensibly under the supervision of the enterprising Mr. Hyde, the merchant of the firm. Mr. Hyde is a profound admirer of the eminent Dr. Jekyll, the medical director (Jour. A. M. A., Nov. 5, 1921, p. 1499).

Schick Test.—The entire absence of positive reactions to the Schick test in about one dozen children should lead to the suspicion that the particular lot of toxin used is inactive. It is not unlikely that toxin in small outfits may deteriorate after leaving the manufacturer (Jour. A. M. A., Nov. 12, 1921, p. 1594).

Estivin.—This is sold by Schieffelin and Co., New York. A request for a statement of the composition of this product sent to Schieffeli and Co., by the Council on Pharmacy and Chemistry, brought the indefinite and therefore meaningless statement that Estivin is an extract of Rosa Gallica containing no alcohol or foreign ingredients (Jour. A. M. A., Nov. 12, 1921, p. 1595).

Intravenous Compound (Loffler).—This is exploited by the Intravenous Chemical Company of Chicago. While physicians are asked to use this preparation and told of the profits to be derived from its use, they are not informed of its composition. From the analysis of this preparation in the A. M. A. Chemical Laboratory it was concluded to be a mixture of alkali chlorate and nitrate and boric acid probably produced by fusing together the constituents. Its composition is very similar to that of Oxychlorin and Zyme-oil, which were analyzed by the laboratory nearly fourteen years ago. Intravenous Compound (Loffler) is a nostrum of secret composition which physicians are asked to inject into the veins of their patients. It must be purchased in connection with some supplementary material, "a complete set of apparatus" sold by the same concern. Its successful administration is said to depend on following a technic detailed either in a booklet sent out by C. L. Loffler or given by him in a "post graduate course" which costs physicians fifty dollars unless they have purchased six dollars' worth of another nostrum "Thymozene." The intravenous administration of drugs is impressive. To the patient the technic and its psychic effects is striking. The dangers of intravenous medication are matters of record, and yet physicians are asked to administer this preparation, the composition of which

and the effects produced by it are unknown to him (Jour. A. M. A., Nov. 12, 1921, p. 1591).

Iodin and Goiter.—According to Marine, if the iodin store in the thyroid is maintained above 0.1 per cent no hyperplastic changes and, therefore, no goiter can develop. The studies of Marine and Kimball show that simple or endemic goiter can be prevented by the administration of from 3 to 5 mg. of iodin twice weekly, over a period of a month and repeated twice yearly. Is it not time for the medical profession to give special attention to this? If prevention of goiter is good preventive medicine, it is better preventive surgery (Jour. A. M. A., Nov. 12, 1921, p. 1574).

Midol Headache Tablets.—Midol was analyzed in the A. M. A. Chemical Laboratory in 1912. At that time the chemists reported that Midol was sold in the form of tablets and to contain amidopyrin (first introduced as pyramidon) as their essential constituent. Amidopyrin is a pyrazolon derivative related to antipyrin, and it has no place in preparations for self drugging (Jour. A. M. A., Nov. 19, 1921, p. 1674).

Seleni-Bascca.—A campaign of free publicity is carried on for an alleged remedy for cancer. The press agent material has been of two kinds—for medical journals and for newspapers. That for medical journals has been sent out on the stationery of the Medical News Bureau, 77 Seventh Ave., Brooklyn, N. Y., D. E. Woolley, Manager. The items sent out to medical journals stated that the "Basic Cancer Research" had been organized to develop a treatment of cancer by the use of selenium and tellurium. The material received by newspapers was sent out by the "Cosmopolitan Cancer Research Society," 847 Union St., Brooklyn, (the same address as the Basic Cancer Research). The secretary of the Cosmopolitan Cancer Research is D. E. Woolley. The name of the preparation which the Basic Chemical Corporation puts out is Seleni-Bascca. A specimen, labeled "SELENI-BASCCA a mixture of Colloidal Selenium in tablet form", was examined in the A. M. A. Chemical Laboratory. The tablets were found to contain only about 1.3 per cent of selenium, and the product was not colloidal as claimed. The composition of Seleni-Bascca resembles that claimed for Sulpho-Selene, a preparation reported on by the Council on Pharmacy and Chemistry some years ago, but it contained no bile salts (a constituent claimed to be present in Sulpho-Selene.) (Jour. A. M. A., Nov. 19, 1921, p. 1672).

Serum for Pernicious Anemia.—"Ph. Rahtjen, A. M., Ph. D." Pasadena Calif., informs laymen that he has immunized goats against the germ of pernicious anemia and that patients have responded favorably to the "serum". Reference to medical literature does not disclose just what Rahtjen's serum is, and a search of American medical literature for some years past fails to disclose any publication by Rahtjen on any subject. In 1917 the Rahtjen Tuberculosis Sanatorium, San Francisco, Calif., exploited the Rahtjen Cure for Tuberculosis with the claim that "the remedy seems to cure tuberculosis in all its forms with equal celerity and certainty"; and yet people are still dying of tuberculosis. In 1920, so the newspapers had it, Rahtjen was offering a "New-Life Fluid" which was a long step forward to counteract old age. This was in March, 1920, yet people continue to grow old. According to recent newspaper accounts, Rahtjen is making his extract from Mexican bulls and cows; the first for males and the second for females (Jour. A. M. A., Nov. 26, 1921, p. 1753).

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

PHYSICIANS LICENSED AT THE OCTOBER, 1921, EXAMINATION TO PRACTICE IN MINNESOTA

UPON EXAMINATION

NAME	SCHOOL OF GRADUATION	ADDRESS
Baskett, Edgar Drane	Johns Hopkins, M. D. 1919	Mpls. Univ. Hosp. Minn.
Baughn, Henry Alden	U. of Pa. M. D. 1917	Rochester, Minn.
Brown, Philip Walling	U. of Pa. M. D. 1920	Rochester, Minn.
Chaney, Wm. Calvert	U. of Pa. M. D. 1917	Rochester, Minn.
Desbrisay, Harold A.	McGill, M. D. 1917	Rochester, Minn.
Fardy, Martin J.	Wash. U. M. D. 1918	Rochester, Minn.
Foucar, Hans Olding	Western U. Ont. M. D. 1917	Rochester, Minn.
Foulds, Gordon S.	U. of Toronto, M. B. 1914	Rochester, Minn.
Grant, Hendrie Walter	Bowdoin, M. D. 1920	c/o Miller Hospital, St. Paul, Minn.
Jepson, Paul Newton	U. of Pa. M. D. 1920	Rochester, Minn.
Joseph, Edward Gordon	U. of Edinburgh, M. B. 1918	Rochester, Minn.
Lockwood, Ambrose L.	McGill, M. D. 1910	Rochester, Minn.
Luden, Georgine M.	U. of Munich, M. D. 1912	Rochester, Minn.
Masson, Duncan M.	U. of Toronto, M. B. 1920	Rochester, Minn.
McCorvie, John Edward	U. of Toronto, M. B. 1914	Rochester, Minn.
McNeal, Morley Daniel	Johns Hopkins, M. D. 1917	Rochester, Minn.
Mebane, Donald C.	Columbia U. M. D. 1920	Mpls. Univ. of Minn.
Merrill, Urban Howe	Bowdoin, M. D. 1920	621 Beacon St. S. E., Mpls, Minn.
Mitchell, Jos. I.	U. of Tenn. M. D. 1919	Rochester, Minn.

Moore, Thos. David	Vanderbilt, M. D. 1916	Rochester, Minn.
Mulholland, Stanley C	U. of Minn. M. B. 1921	Rochester, Minn.
Ross, James Wells	U. of Toronto, M. B. 1915	Rochester, Minn.
Schoonover, Frank S., Jr.	Columbia U. M. D. 1918	Rochester, Minn.
Sutherland, Chas. Goldie	U. of Toronto, M. B. 1907	Rochester, Minn.
Weir, James Fisher	Western U. M. D. 1918	Rochester, Minn.

THOROUGH RECIPROCITY

Abrams, Wilmer David	U. of Pa. M. D. 1919	Rochester, Minn.
Andreas, Rudolph Geo.	American Coll. Med. & Surg. 05. (Lovola)	
Adams, Julius	Marquette, M. D. 1921	Rochester, Minn.
Anderson, Carl M.	Marquette, M. D. 1911	Rollingstone, Minn.
Arnquist, Andrew Samuel	U. of Ill. M. D. 1920	Rochester, Minn.
Baker, Clark Everett	Vanderbilt, M. D. 1917	St. Paul, Minn., 896 Payne Ave.
Bayard, Walter D.	N. W. M. D. 1917	Rochester, Minn.
Bradley, Everett L.	Geo. Wash. D. C. M. D. 1920	Fargo, N. D., 65 Edwards Bldg.
Bryan, Albert W.	U. of Ia. M. D. 1920	Rochester, Minn.
Brock, Samuel	Johns Hopkins, M. D. 1916	Rochester, Minn.
Callahan, Harry Thomas	Marquette, M. D. 1920	Rochester, Minn.
Cameron, Angus L.	Rush, M. D. 1916	Lewiston, Minn.
Casmey, Lewis Nelson	N. W. M. D. 1921	U. of Minn. Mpls.
Cathcart, Edward P.	U. of Mich. M. D. 1921	Crookston, Minn.
Craig, Winchell McKendree	Johns Hopkins, M. D. 1919	Rochester, Minn.
Ehramann, Evelina Wilhelmina	Rush, M. D. 1921	Rochester, Minn.
Enochs, Robert Jones	Tulane, M. D. 1909	Rochester, Minn.
Frazer, Emmett B.	U. of Ala. M. D. 1918	Alden, Minn.
Gardner, Victor Hugo	University of Ia. M. D. 1919	Rochester, Minn.
Garlock, DeWitt Howard	Rush, M. D. 1921	Dunnell, Minn.
Hwer, Carl Aaron	Ohio Univ. M. D. 1920	Bemidji, Minn.
Janjigian, Robert R.	Boston Univ. M. D. 1918	Rochester, Minn.
Kenny, Herbert Francis	U. of Mich. M. D. 1916	Mpls. 2719 Ulysses St. N. E.
Kerlanski, Samuel Z.	N. W. M. D. 1921	St. Paul, Minn., 684 Summit Ave.
Knauf, Arthur R.	Rush, M. D. 1916	Bowlus, Minn.
Koons, Karl Monroe	Indiana U. M. D. 1917	Rochester, Minn.
Madison, Elizabeth	Hah. Chicago, M. D. 1906	Rochester, Minn.
McEnaney, Jas. B.	Keokuk, M. D. 1878	Duluth, Minn., 2032 E. Superior St.
McGuire, Louis David	Creighton, M. D. 1917	Holland, Minn.
Nye, Lillian Lydia	Johns Hopkins, M. D. 1921	Rochester, Minn.
Pardee, Katherine	Johns Hopkins, M. D. 1918	St. Paul, Minn., 803 Lowry Bldg.
Powell, Lester Davis	University of Iowa, M. D. 1918	Rochester, Minn.
Pulford, DeLos S., Jr.	John Hopkins, M. D. 1917	Rochester, Minn.
Proctor, Oscar S.	N. W. M. D. 1920	Rochester, Minn.
Rice, Geo. Ernest	U. of Pa. M. D. 1918	Rochester, Minn.
Rockwell. Donald C.	N. W. M. D. 1920	Rochester, Minn.
Senty, Elmer Geo.	Rush, M. D. 1916	Rochester, Minn.
Shipley, Harry M.	U. of Neb. M. D. 1919	Rochester, Minn.
Snyder, John W.	U. of Mich. M. D. 1906	Adams, Minn.
Struthers, John Edmund	Medico-Chirurgical	Rochester, Minn.
	Col. Pa. M. D. 1915	Rochester, Minn.
Taylor, Richard V., Jr.	U. of Va. M. D. 1910	Rochester, Minn.
Wahle, George Henry	Wash. U. St. Louis, Mo. M. D. 1919	Mpls. Minn., 88 Spruce Place.
Wilhelm, Louis F. X.	St. Louis U. M. D. 1920	Rochester, Minn.
Wilkins, James Alex.	U. of Va. M. D. 1919	Rochester, Minn.
Winter, Malcolm D.	U. of Ia. M. D. 1917	Rochester, Minn.

NATIONAL BOARD CREDENTIALS

Baird, Burton Argyle	U. of Iowa, M. D. 1915	Rochester, Minn.
Burden, Verne Gerard	U. of Pa. M. D. 1919	Rochester, Minn.
Hoon, Merle Russell	U of Pa. M. D. 1918	Rochester, Minn.
McFarland, Albert Rankin	U of Pa. M. D. 1918	Rochester, Minn.
Meeker, William Raymond	Rush, M. D. 1920	Rochester, Minn.
Noonan, James Joseph	Rush, M. D. 1919	Rochester, Minn.
Scholl, Albert John, Jr.	Harvard, M. D. 1916	Rochester, Minn.
Sprunt, Wm. Hutchinson, Jr.	U. of Pa. M. D. 1918	Rochester, Minn.